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ABSTRACT

Revised to reflect changes in both DIALOG and ERIC, this second edition of a self-improvement manual for online searchers who wish to refine their skills presents three basic approaches to searching and provides illustrations from DIALOG's ERIC ONTAP database. The manual is divided into two parts: an 8-step model of the total search process which emphasizes the effects of the searcher's decisions on retrieval results and search objectives, and an introduction to DIALOG's ERIC ONTAP file followed by 16 self-improvement exercises based on search topics stored in the database; six of these exercises are on different topics from the original edition. The ONTAP file is a subset of the ERIC file consisting of RIE and CIJE citations for 1975, and 29 simple, moderate, and difficult search questions with answer sets. The database has been updated for use with the 1980 edition of the Thesaurus of ERIC Descriptors. The appendices include 10 "search save" formulations of common search facets and a comprehensive guide to the ERIC database. (BBM)

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ONTAP™

ONLINE TRAINING AND PRACTICE MANUAL FOR ERIC DATA BASE SEARCHERS

BY KAREN MARKEY AND PAULINE A. COCHRANE

BASED ON THE EARLIER UNPUBLISHED WORK OF
CHARLES P. BOURNE, BARBARA ANDERSON,
AND JO ROBINSON

2nd edition

ERIC CLEARINGHOUSE ON INFORMATION RESOURCES
SYRACUSE UNIVERSITY
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TABLE OF CONTENTS

PREFACE 1

SECTION I: THE PROCESS OF ONLINE SEARCHING 3

Introduction to the Steps and Functions of Online Searching. 3

Step 1. Defining the Information Need and Search Objectives . . 6

Step 2. Identifying Relevant Data Bases 9

Step 3. Formulating Basic Search Logic--Planning Search Strategies 10

Step 4. Compiling the Search Terms 22

Step 5. Ordering Output 24

Step 6. Conceptualizing the Search as Input to the Retrieval System 26

Step 7. Evaluating Preliminary Results 36

Step 8. Evaluating Final Results 37

SECTION II: ERIC ONTAP EXERCISES FOR SELF-IMPROVEMENT OF ONLINE SEARCHING 39

Introduction to DIALOG's ERIC ONTAP 39

Sample Search Topic. Parapsychology 43

Search Topic 1. Title IX and Women's Sports 50

Search Topic 2. 4-H Clubs 58

Search Topic 3. 16 Personality Factor Test 60

Search Topic 4. Primary School Reading Programs 63

Search Topic 5. School Busing 71

Search Topic 6. Language Textbooks 75

Search Topic 7. AACR Revision 78

Search Topic 8. Drug Abuse 81

Search Topic 9. Vocational Education 85

Search Topic 10. Piaget 89

Search Topic 11. Charging for Library Services 94

Search Topic 12. White Flight to the Suburbs 97

Search Topic 13. Federal Aid to Day Care Centers 99

Search Topic 14. Education in Sri Lanka 102

Search Topic 15. Audiovisual Aids for Library Orientation . . . 105

Search Topic 16. Management Training 109

APPENDIX 113

Common Search Facets/Search Save Formulations 113

Search Facet 1. Primary Education 116

Search Facet 2. Elementary Education 117

Search Facet 3. Secondary Education 119

Search Facet 4. Children 121

Search Facet 5. American Indians 123

Search Facet 6. Audiovisual Aids 124

Search Facet 7. Evaluation (High Recall) 129

Search Facet 8. Evaluation (High Precision) 132

Search Facet 9. Mentally, Neurologically, and Emotionally Handicapped 135

Search Facet 10. Preschool 139

Guide to DIALOG's ERIC Data Base 141

INDEX 175

PREFACE

As more and more online searchers gain experience, there appears to be a need for online and offline aids to support searchers through the "improver" stage of training and practice. Few examples serving this purpose can be found in the literature, but we learned of a project in this area in early 1977. At the suggestion of, and with the encouragement and support of Oscar Firschein at Lockheed Information Systems, Charles Bourne and his colleagues at the Institute for Library Research (ILR) at the University of California, Berkeley, were developing a special ERIC/DIALOG file for online training and practice. This file was being specially designed to allow online searchers to compare their search results with the results of a "perfect search." The Berkeley group developed "answer sets" for some 20 search requests by exhaustively searching a file of ERIC 1975 citations for relevant hits. The composite results of all their search strategies for each question became the "perfect answer set." For each search topic, they offered several representative formulations to meet different search objectives (e.g., high recall, high precision, or low cost).

Oscar Firschein arranged to have 1975 ERIC accessions and the 29 search questions with their answer sets loaded on the DIALOG system. He developed and implemented the /EVAL command on the DIALOG system. This automatically computes a recall and precision score for any searcher's effort on the ONTAP™ questions by comparing the searcher's results with the "perfect answer set."

A draft report was prepared by the ILR group to document their work, but it could not be published before they left ILR. In late 1977 at ERIC/IR, we decided to work from their draft, with their permission, and develop an "improver's" manual for searching the ONTAP database online.

The purpose of this publication is neither to train beginning searchers nor to provide an orientation to computer-based searching of ERIC. Other publications already perform these functions quite admirably.[1]

---

[1] Atherton, Pauline and others. Online Searching of ERIC. Syracuse, NY: ERIC/Clearinghouse on Information Resources, 1979. ED 180 431 (235p.), ED 180 432 (41p.)

Bourne, Charles, P. and others. Analysis of ERIC On-line File Searching. Procedures and Guidelines for Searching. Final Report. Berkeley, CA: University of California, Institute of Library Research, and Palo Alto, CA: Lockheed Research Laboratories, Nov. 1974. ED 101 757 (156p.).

Bourne, Charles P. DIALOG Lab Workbook. 3rd Edition. Palo Alto, CA: Lockheed Research Laboratories, 1981.

Our objective has been to develop the Bourne, Robinson and Anderson draft report into a manual that the experienced searcher can use for self-improvement. In the first section, a model of the total search process is discussed in order to emphasize how the decisions of the information professional affect retrieval results and search objectives at each step of the process. The second section begins with an introduction to DIALOG's ONTAP file (201), which is followed by "self improvement" exercises selected from the questions stored in the ONTAP file. The first exercise provides an in-depth explanation of the ONTAP file as directions from the ONTAP file, the EVAL capability, and selecting self-improvement exercises are discussed in detail. Within a self-learning environment, the searcher is encouraged to analyze and compare his/her search objectives and output with that of other searchers as s/he proceeds with the exercises.

We have been heartened by the reception of the first edition of this manual since its 1978 publication. Since then the Identifier Clean-Up, the Vocabulary Improvement Project, the publication of the 8th edition of the Thesaurus of ERIC Descriptors, and the updating and reloading online of the ERIC database, have necessitated the revision of ERIC ONTAP (File 201 on DIALOG) and this manual.

As an aid to all ERIC online searchers, we have included in the appendix several search saves for population level and tool concepts when these are not easily handled by the DIALOG SuperSELECT features because of vocabulary problems. These can be accessed and exchanged between DIALOG workspaces by using the procedures explained in the introduction to the appendix.

Comments about this manual are welcome and should be addressed to:

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George, Paulette Foss. "To Search or Not to Search." Interchange (Aug. 1981):14-15.

Meadow, Charles T. and Cochrane, Pauline A. Basics of Online Searching. New York: Wiley, 1981.

Yarborough, Judith. How to Prepare for a Computer Search of ERIC: A Non-Technical Approach. Stanford, CA: ERIC Clearinghouse on Information Resources, Sept. 1975. ED 110 096 (44p.)

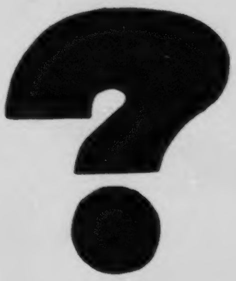
Yarborough, Judith, "A Novice's Guide to ERIC--The Data Base of Education." Online 1,3(July, 1977):24-29.

SECTION I

THE PROCESS OF ONLINE SEARCHING

INTRODUCTION TO THE STEPS AND FUNCTIONS OF ONLINE SEARCHING

Online searching has been divided into eight steps, each requiring off-line activities in preparation for the online activity. As the searcher progresses from one step to the next, s/he is faced with decisions which affect the succeeding steps. The following outline is accompanied by an abstract of the functions performed during each step in the process of online searching. The eight steps are treated in detail in the sections following the outline:

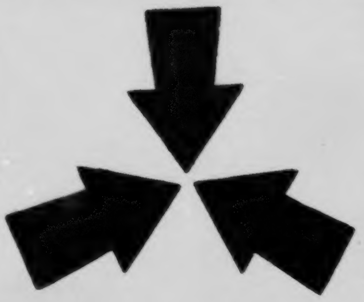


1

DEFINING THE INFORMATION-NEED AND SEARCH OBJECTIVE

Interviewing the information seeker clarifies the request and determines search objectives:

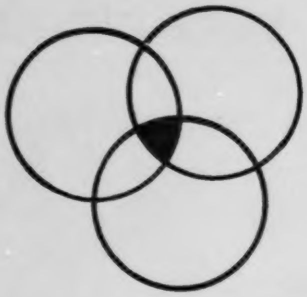
a) retrieve all relevant items (high recall), or
b) retrieve only relevant items (high precision), or
c) retrieve some relevant items (Briefsearch).



2

IDENTIFYING RELEVANT DATA BASES

Determining which online database to use first, which next, etc.



3

FORMULATING BASIC SEARCH LOGIC -- PLANNING SEARCH STRATEGIES

Analyzing the search topic into facets or concept groups. Planning approaches to search strategy for combining concepts of the topic.

4

COMPILING THE SEARCH TERMS

Choosing descriptors from the ERIC Thesaurus or other printed word lists. Selecting terms in identifier field and free text for searching subject-conveying fields (title, abstract, etc.). Using thesaurus and alphabetic word lists online.

5

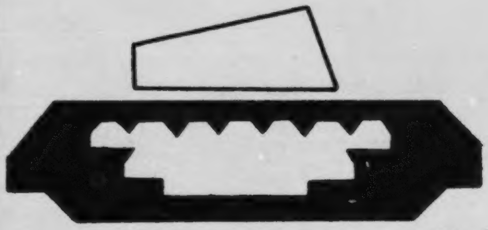
ORDERING OUTPUT

Limiting and printing output (offline and online). Selecting an approach to search strategy which best satisfies the search objectives expressed by the requestor.

6

CONCEPTUALIZING THE SEARCH AS INPUT TO THE RETRIEVAL SYSTEM

Arranging the search terms into concepts or facets, noting most important and less important concept groups, restricting or limiting output.



7

EVALUATING PRELIMINARY RESULTS

Reviewing search results, step by step, and considering alternate search strategies to meet search objectives (recycling steps 1-6).

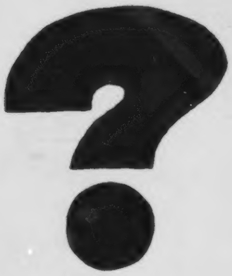
8

EVALUATING FINAL RESULTS

Determining client satisfaction with search results.

STEP 1

DEFINING THE INFORMATION-NEED AND SEARCH OBJECTIVES



The first step in the search model is to identify the client's information-need through personal or telephone interviews or through written messages. Since this activity forms the basis of the search strategy, it is necessary that the information-need be described in as precise, specific and complete a manner as possible.

To ensure that the information specialist has received from the client all that is needed for searching, it may be advisable to check whether the following questions have been answered:

Clarification of Request	• Is there an agreement on the narrative statement of the information-need?
Request Negotiation	• Has the search objective been agreed upon? • Have the subject area terminology and literature sources been discussed? • Are there any limits or constraints to be imposed on output (date, language, type of information item)?
Search Vocabulary	• Do the client and information specialist agree upon the selection and/or exclusion of search terms? • Have the options of free text and controlled term searching been discussed? • What vocabulary aids have been selected?
Search Strategy Formulation	• Is there agreement on the formation of concept groups? • Have order of search statements and combinations of concept groups been discussed? • What alternate search strategies have been discussed? • Have output formats and limits been decided?
Administrative Details	• What are the arrangements concerning delivery of output and billing? • Has a post-hoc evaluation been arranged?

For any given search there appear to be at least three different types of search objectives:

1) to retrieve all relevant items--a high recall search

2) to retrieve only relevant items--a high precision search

3) to retrieve some relevant items--a brief search

a) A high recall search[1] is formulated when the information seeker needs to find everything on the stated topic. It is necessary that the person writing a dissertation or conducting a patent search find all the relevant citations, thus a high recall search is required. In this case, the searcher must include all word variants and synonyms for each concept. An example of taking into account variant spellings and synonyms is taken from the search topic, parapsychology, the sample self-improvement exercise in Section II.

S PARAPSYCH?	Using the DIALOG truncation symbol, ?, allows the searcher to retrieve variant forms of the root, e.g., Parapsychology, Parapsychological, etc., instead of keying-in these terms separately.
S EXTRA(W)SENSORY S EXTRASENSORY	The term Extrasensory, a concept synonymous with Parapsychological, is typed as a single word and as two adjacent words in order to retrieve different spellings of the same term.
C 1-3/OR	All documents retrieved by the three search terms are added together by the Boolean OR function.

Oftentimes a certain volume of non-relevant or marginally relevant output would have to be examined to ascertain that high recall had been obtained.

b) A high precision search[2] retrieves much relevant material, but with fewer non-relevant items in the output. Such a search would usually use only specific descriptors or terms representing concepts in the search with no generic term searching. An example of a high precision search formulation, the search topic "Identification of the gifted" contains two concepts that can be represented by ERIC descriptors; thus, statements of a high precision search would include the descriptors, Identification and Gifted.

---

[1] Recall is defined as the percentage of relevant items in the file that are retrieved by the search.

[2] Precision is defined as the percentage of retrieved items that are relevant to the search topic.

The following example would retrieve only ERIC accessions whose title includes both terms, GIFTED and IDENTIFICATION, or accessions with both IDENTIFICATION and GIFTED assigned as full descriptors.

```
SS GIFTED/DF,TI AND IDENTIFICATION/DF,TI
```

Thus, in the example above, high precision is dependent upon the function of the descriptors and the title to describe accurately the intellectual content of the document.

c) The brief search (called Briefsearch in this workbook) is done in response to the need for retrieving a few items either to lessen expenses or to perform a rapid survey of the file before a more comprehensive and lengthy strategy. The Briefsearch is necessarily a low recall search, performed in such a way that maximum results can be achieved with little online time. Choice of priority concepts is a factor in designing a Briefsearch.

A good example of the Briefsearch is in Search Topic #6, "Revision of the Anglo-American Cataloging Rules." In a single statement, using DIALOG's SuperSELECT command, the search is performed featuring the two facets of the topic, REVISION and AACR.

SS ANGLO(1W)CATALOGING AND REVISION	The use of word proximity (1W) accounts for spelling variations. DIALOG'S SuperSELECT feature allows the input of two concepts, i.e., REVISION and ANGLO-AMERICAN CATALOGING RULES, in a search statement.

More detailed formulations of the topic are given in Section II; as you proceed through the self-improvement exercises, compare the performance of the Briefsearch with the other formulations in terms of recall, precision, and online connect time. In most cases, the search queries in Section II contain sample formulations for each of these three types of search objectives.

STEP 2

IDENTIFYING RELEVANT DATA BASES

With over 250 bibliographic databases online at this writing, this step in the search process is becoming more and more important. However, the inverted file contents of the many databases have been merged into a single database, e.g., DIALINDEX, CROSS, Database Index, and made available for searching. Thus, the searcher's task of identifying relevant databases has been eased.

For the purposes of the manual, it is assumed that ERIC is the first choice and we will just move on. For help with this step, the reader is referred to such articles as:

Angier, Jennifer J., and Epstein, Barbara A. "Multi-Database Searching in the Behavioral Sciences, Part 1 and Part 2." Database 3,3 (Sept. 1980):9-15; 3,4(Dec. 1980):34-40.

Antony, Arthur. "The Database Index." Database 2,4(Dec. 1979): 28-33.

Burton, Hilary D. "Multi-Data Base Searching in Agriculture. A Cooperative, Computerized Service." Special Libraries 69,7(1978): 244-249.

Dolan, Donna R. "The BRS CROSS Database." Database 3,4(Dec. 1980): 50-55.

Donati, Robert. "Selective Survey of Online Access to Social Science Data Bases." Special Libraries 68,11(Nov. 1977):396-406.

Donati, Robert. "Survey of Online Access to Social Science Data Bases." Paper presented at the Special Libraries Association Annual Conference, Denver, CO, June 8, 1976. ED 128 011 (21p.)

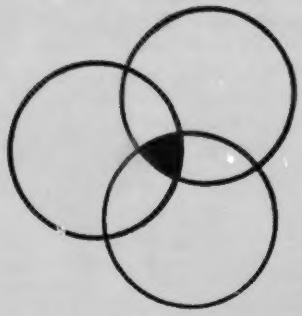
Hawkins, Donald T. "Multiple Database Searching: Techniques and Pitfalls." Online 2,2(April 1978):16-21.

Teitelbaum, Henry H., and Hawkins, Donald T. "Database Subject Index." Online 2,2(April 1978):16-21.

Wanger, Judith. "Multiple Database Use." Online 1,4(Oct. 1977): 35-41.

STEP 3

FORMULATING BASIC SEARCH LOGIC -- PLANNING SEARCH STRATEGIES



There is no single way to formulate a subject search, nor one best way given to fulfill the same search requirement. Different searchers will approach searches in different ways, and will assemble different formulations. Some of this is due to differences in the way people approach or attack a given problem in general. There may be several different formulations that give essentially the same performance, but all searchers will agree that a search should be analyzed into facets or concept groups. Facet indicates a separate aspect of a query. For example, a query on the "Effects of TV violence on children" can be separated into three distinct concept groups (or facets, notions, parts, components):

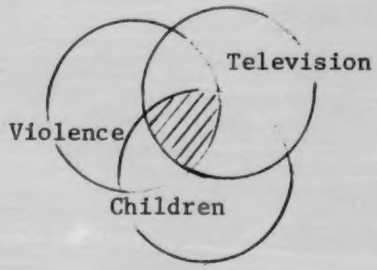
1) Television

2) Violence

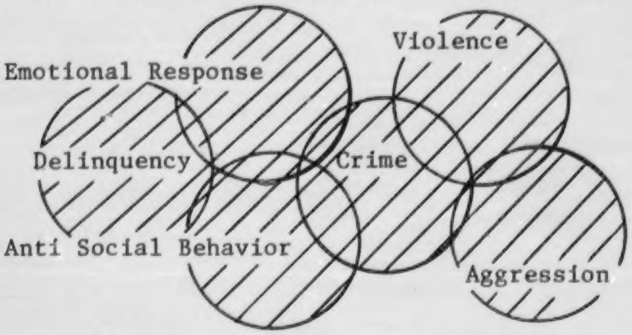
3) Children

In order to perform an online search, these three facets are joined using Boolean logic operators such as AND, OR, NOT. Since all three facets must be present to satisfy the stated information need, the Boolean operator AND is used with the search terms selected to represent the three facets.

In the illustration below, the three facets are represented by circles; the place where all three circles intersect forms the portion of the database which contains records with all three facets.



In order to retrieve citations from the intersection of the three concept groups, each facet is represented by any number of synonymous terms. These terms are then assembled into a series of search statements and combined by the Boolean OR operator to produce a "complete" set of citations for that facet. In the example below, the facet VIOLENCE is made up of six search terms--Crime, Antisocial Behavior, Aggression, Emotional Response, Violence, and Delinquency--combined by the OR operator. How many of these terms and their variant forms could be searched depends on the searcher.



The inclusion of more synonymous terms in the set representing VIOLENCE would relax the search requirement (or allow for more opportunity for matches) and permit the formulation to be satisfied by more citations. As a general principle which is independent of either database or retrieval system, the inclusion of ORs increases the volume of output. On the other hand, the inclusion of ANDs decreases the volume of output since every AND condition added to a formulation tends to make the search more restrictive (or reduce opportunities of matches) and results in less output. Thus both the total number of output citations, and the total number of relevant citations retrieved tend to decrease with each additional AND condition.

Likewise, the inclusion of NOTs decreases the volume of output. However, the NOT condition may also cause relevant citations to be excluded from the output when a citation contains both the desired terminology and the unwanted terms. Thus, both the total number of output and the total number of relevant citations decreases with each additional NOT condition.

It is quite possible that a given search request might be viewed by two different searchers as consisting of a different number of facets. This seems to depend upon the language of the topic, indexing vocabulary, and interpretation of the query and indexing language by the searcher when interviewing the client. For example, the search topic, "AV aids for library instruction of users," has been divided into two formulations in the following example:

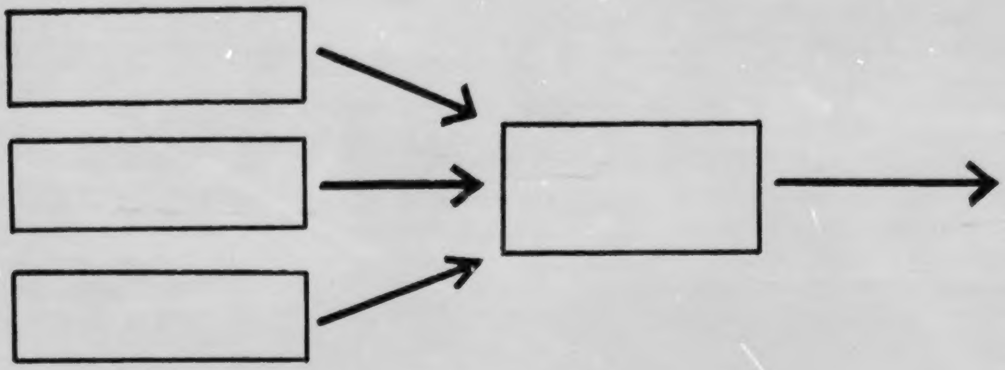
Formulation A			Formulation B	
AV Aids	Library Instruction	Users	AV Aids	Instruction of Library Users
(1)	(2)	(3)	(1)	(2)

These differences in conceptualizing the query will result in different search formulations. The approaches to concept in query and the combination of conceptual groups form the central core of the online search strategy process. Models of several of the more predominant approaches to executing search strategy are shown in idealized representations in the following discussion on approaches to search strategy. No particular sequence is intended, and there is no intention to recommend one approach over the others. The object of the illustrations and discussion is to heighten each searcher's interest in which approaches are used and to aid in the analysis of which approach yields what kind of results.

1. Building Blocks

The first of the approaches is the building block (or sub-assembly, or modular) approach, and is characterized by an attempt to develop each aspect of the search separately, as if it were a subsearch all on its own, and then make the final logical assembly of all of these subprograms.

This is a predominant style for many searchers. Individuals who are accustomed to break all of their problems into subproblems may use the building block approach as a natural extension of their own method of tackling a specific problem.



BUILDING BLOCK APPROACH

The building block approach, illustrated above, is demonstrated in the following search topic on "Identification of the artistically gifted." The topic is broken down into three concept groups: GIFTED, IDENTIFICATION, and ARTISTIC. In the table below are listed the three facets accompanied by search terms used to represent the facets in the search formulation.

ARTISTIC
Art
Arts
Artistic
Artistically
Esthetic -ally
Esthetics
Aesthetic -ally
Aesthetics

GIFTED
Gifted
Talent
Talents
Talented

IDENTIFICATION
Identify
Identified
Identifying
Identification
Identifies

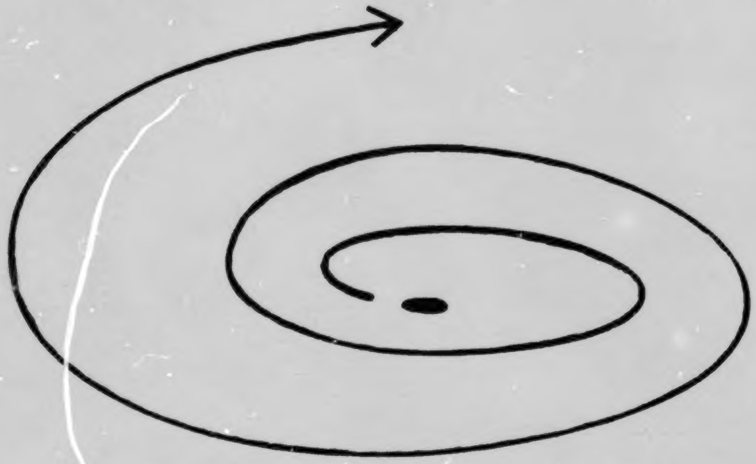
Terms from each facet are then assembled into search statements joined by the OR operation. The final step in the building block approach is to combine the results of the subsearches, in this case, by the AND operator.

Formulation	Comments
1 SS ART? ? OR ARTISTIC? OR ESTHETIC? OR AESTHETIC?	This SuperSELECT statement forms the concept group ARTISTIC from four word stems (=statement 5).
6 SS GIFTED OR TALENT?	This SuperSELECT statement forms the facet GIFTED from two word stems (=statement 8).
9 S IDENTIF?	Statement 9 forms the facet IDENTIFICATION.
10 C 5 AND 8 AND 9	The combination of the three facets by the AND operator is done in the final search statement.

The building block approach has the advantage of providing a somewhat clearer trace history, one that is easy to review and understand at a later date. It tends to follow and read like the actual query formulation; however, disadvantages of the approach are that more working memory and online time are used in comparison to the other approaches since the searcher establishes new sets with each command and introduces the main AND conditions only at the final stage of formulation. This approach may use more online time than is necessary. For example, the union of two concept groups in a three-facet search may result in no or so few citations that it would not be necessary to impose the third condition. In that case, developing the third subprogram before a final COMBINE operation on the three subprograms would be an unnecessary use of time and effort. A modification of this approach would be to perform a Briefsearch in order to establish the likelihood that the combination of one term from each of the three facets results in some hits.

2. Citation Pearl Growing

This approach makes the most use of the interactive capabilities of the online search system. The technique here is to start with a very direct search on the most specific terms in the search request and find at least one citation. The searcher then calls up one or more of these citations for online review, noting index terms and free text found in some relevant citations. These new terms are incorporated into the formulation to retrieve additional citations. After adding these terms to the formulation, one can again review more retrieved citations and continue this process in successive iterations until no additional terms are found that seem appropriate for inclusion.



CITATION PEARL GROWING APPROACH

The citation pearl growing approach to search strategy is illustrated above. The topic, "Identification of the artistically gifted," is searched using this approach. The Briefsearch is first employed to retrieve a few citations for online review. The SuperSELECT STEPS feature of DIALOG is used to create intermediate sets along with the final Boolean operation. In this way, the searcher can use the intermediate results when revising the search formulation at a later time.

Briefsearch

1. SS GIFTED AND IDENTIFICATION AND ARTISTIC

One citation is retrieved and printed in format 2 so that the descriptors can be reviewed for possible inclusion in a revised formulation.

```
T1/2/1
ED104039   EC071443
     THE IDENTIFICATION OF ACADEMIC, CREATIVE AND LEADERSHIP TALENT FROM
BIOGRAPHICAL DATA.  FINAL REPORT.
     INSTITUTE FOR BEHAVIORAL RESEARCH IN CREATIVITY, SALT LAKE CITY,
UTAH.; NORTH CAROLINA STATE DEPT. OF PUBLIC INSTRUCTION, RALEIGH.  DIV. FOR
EXCEPTIONAL CHILDREN.
     74   76P.
     SPONSORING AGENCY:  Z. SMITH REYNOLDS FOUNDATION, SAPELO ISLAND, GA.
     EDRS PRICE MF01/PC04 PLUS POSTAGE
     DESCRIPTORS:  ACADEMIC ACHIEVEMENT/ *BEHAVIOR PATTERNS/ *CASE STUDIES
(EDUCATION)/ CREATIVE ABILITY/ *CULTURAL FACTORS/ EXCEPTIONAL CHILD
RESEARCH/ *GIFTED/ HIGH ACHIEVERS/ *IDENTIFICATION/ LEADERSHIP/ RACIAL
FACTORS
```

The searcher scans the printed record and decides to incorporate into the formulation the phrase, Creative Ability, which is found in the descriptor field.

Substituting the descriptor phrase, Creative Ability, for the term Artistic, the intermediate steps of the Briefsearch are used in a revised formulation.

Briefsearch

5 SS CREATIVE(W)ABILITY AND IDENTIFICATION AND GIFTED

Five citations are retrieved; typing the retrieved citations in format 6 allows the searcher to browse the titles of the set in order to find candidates for printing more portions of the record.

```
5/6/1
ED104095
     THE GIFTED AND TALENTED:  A HANDBOOK FOR PARENTS.  WORKING DRAFT.

5/6/2
ED104094
     THE IDENTIFICATION OF THE GIFTED AND TALENTED.

5/6/3
ED104039
     THE IDENTIFICATION OF ACADEMIC, CREATIVE AND LEADERSHIP TALENT FROM
BIOGRAPHICAL DATA.  FINAL REPORT.
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5/6/4
ED102773
     SUGGESTIONS FOR IDENTIFICATION OF GIFTED AND TALENTED STUDENTS.

5/6/5
ED100102
     TEACHING GIFTED CHILDREN ART IN GRADES ONE THROUGH THREE.
```
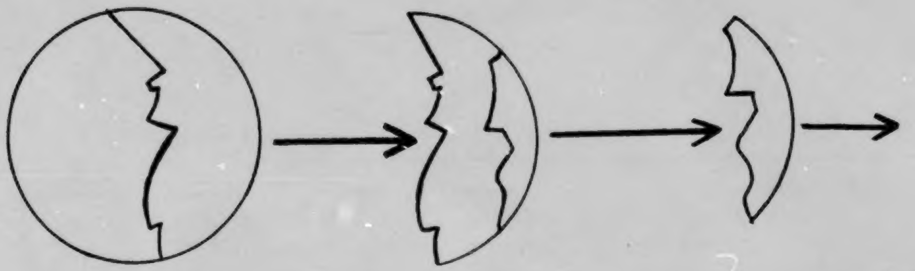

The last title seems relevant to the search topic so it is then printed in format 2.

```
T5/2/5
ED100102  95  EC070972
     TEACHING GIFTED CHILDREN ART IN GRADES ONE THROUGH THREE.
     LUCA, MARK C.; ALLEN, BONNIE
     CALIFORNIA STATE DEPT. OF EDUCATION, SACRAMENTO.  DIV. OF SPECIAL
EDUCATION.
     74  46P.; FOR ADDITIONAL INFORMATION, SEE ED 088 253 AND ED 082 433
     SPONSORING AGENCY:  BUREAU OF ELEMENTARY AND SECONDARY EDUCATION
(DHEW/OE), WASHINGTON, D.C.
     EDRS PRICE MF01/PC02 PLUS POSTAGE
     DESCRIPTORS:  *ART/ CLASS ACTIVITIES/ CREATIVE ABILITY/ CREATIVE
EXPRESSION/ *CURRICULUM DEVELOPMENT/ CURRICULUM GUIDES/ EXCEPTIONAL CHILD
EDUCATION/ *GIFTED/ PRIMARY GRADES/ *PROGRAM PLANNING
     IDENTIFIERS:  ELEMENTARY SECONDARY EDUCATION ACT TITLE V/ ESEA TITLE V
```

Additional searching vocabulary derived from this record may include Creative Expression, Art or Arts. This process could then be continued by adding new terms to the Briefsearch formulation or incorporating search terms into a building block or other approach.

Citation pearl growing is characterized by the development of the search formulation in a very dynamic, empirical manner. Thinking time associated with this approach may result in a longer online connect time than might be achieved with searches in which some preparatory work and planning is done before online searching. Not only can online review of retrieved citations be very helpful in the identification of search terms for addition or deletion, but the payoff from this approach can be incorporated into any of the other approaches.



SUCCESSIVE FRACTIONS APPROACH

3. Successive Fractions

Successive fractions (or divide and conquer, or file partitioning) implies that an initial bite of the file is made in order to assemble a set that satisfies the conditions of the first facet of a multi-faceted search. This first facet may be a portion of the file such as year of publication, accession range, ERIC clearinghouse, document type or availability, major descriptor, or major identifier. When the second facet of the search query is applied as an AND condition to the partitioned subfile, the result is the establishment of an even smaller set or subfile. The remaining search facets continue to be applied to the subfile resulting from the previous AND conditions.

DIALOG's LIMITALL feature, when used at the beginning of a search, serves as an example of the successive fractions approach. In the following example, the LIMITALL capability is employed before the search formulation in order to restrict searching to the partitioned subfile, which is, in this case, only the periodical literature subfile.

Formulation	Comments
LIMITALL/EJ	
1 S IDENTIFICATION(F)GIFTED/TI	The retrieved set will contain only the titles of journal articles including the terms Identification and Gifted.

The LIMITALL feature can also be used to restrict document year by using the accession number range. Since ERIC ONTAP contains only 1975 ERIC accessions, the LIMITALL capability for document year has already been imposed.

The successive fractions approach is also employed to restrict volume of output. A good example of this technique is found in search topic #4, "Evaluation of primary school reading materials." Since the combination of all three concept groups, READING, EVALUATION, and PRIMARY EDUCATION retrieves over 300 citations, the volume of output is restricted by limiting search terms to occurrences in the title, identifier, and descriptor fields. Output can also be limited by clearinghouse or document availability or type.

Using the successive fractions approach, the searcher can work with sets that become progressively smaller, and the search can be terminated whenever the size of the set is satisfactory to the searcher. For example, in the following search formulation, 17 citations are retrieved after the application of the second facet. Instead of imposing the third facet, ARTISTIC, and risking the loss of some relevant items, the searcher can terminate the search at this point or limit the output, as in this case, by clearinghouse.

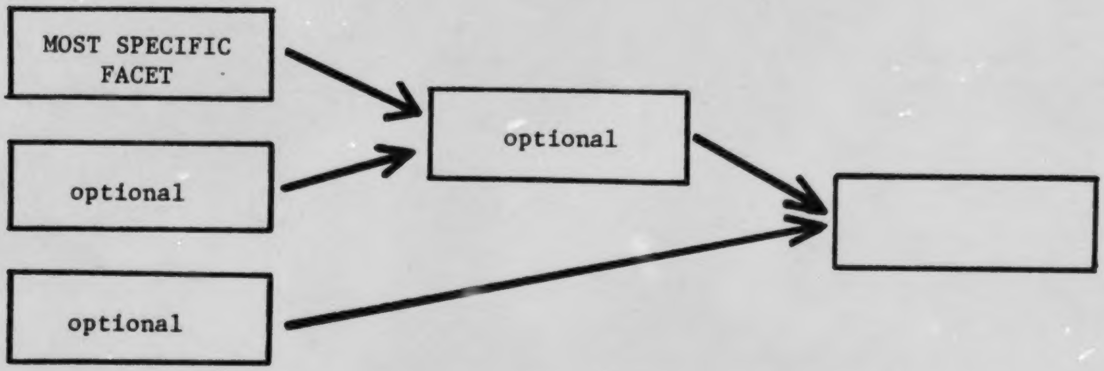
Formulation	Comments
1 SS IDENTIF? AND TALENT?? ?	
4 SS GIFTED AND S3	17 citations are retrieved at this point.
5 S CH=EC	Rather than impose the third facet to the set, the searcher restricts the output to the Clearinghouse on Handicapped and Gifted Children. The output contains 13 citations at the conclusion.
6 C 4 AND 5	

The major advantage with this approach is that it permits the search to be completed at an earlier point than would be the case with the building block approach if the size of the retrieved set fulfills the search objective before exhausting the search facets. The successive fractions approach also eliminates the necessity of "backtracking" or reformulating the search strategy when the final set fails to satisfy the search objectives.

The Boolean NOT operator is used in the formulation below to demonstrate how the successive fractions approach is employed to create a facet AMERICAN INDIANS; since the Indians of India are not wanted in the retrieved set, it is easier to use the NOT operator than to key in all the American Indian tribal names separately.

Formulation	Comments
1 SS INDIAN OR INDIANS OR INDIA	Statements 1 and 2 create a set containing all occurrences of the terms Indian or Indians. Truncation is not used because of the likelihood of retrieving false drops like Indiana or Indianapolis. Statement 3 retrieves all occurrences of "India."
5 C 4 NOT 3	Statement 5 eliminates all occurrences of the term India from the set representing Indians. It is expected that documents containing "India" would treat the subject of the Indians of India, a topic not desired. The operation statement 5 "subtracts" or partitions unwanted documents from the set created by the combination of intermediate sets 1 and 2.

The NOT operator serves as a good illustration of how the file is partitioned and attention is paid only to the newly assembled portion in the successive fractions approach. This approach is often used advantageously with files such as BIOSIS, CA Condensates, and Agricola, as the major subject headings that are used in the printed indexes for these files can be used as search terms at the beginning of a search to form a subfile for detailed subject searching.



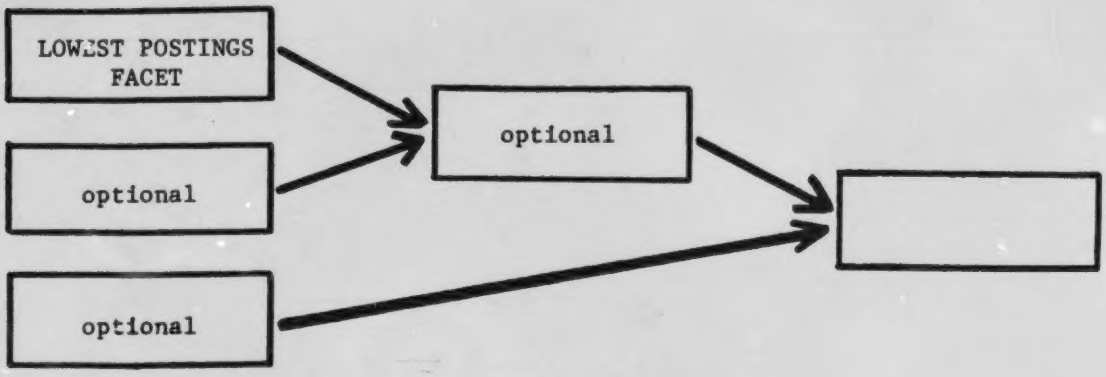
MOST SPECIFIC FACET FIRST APPROACH

4. Most Specific Facet First

This fourth approach consists of starting a multi-faceted search formulation with the most specific aspect of the query that is not likely to suffer from any vagueness of indexing (e.g., a named object such as Foreign Language Test, or Boy Scouts). If the postings are sufficiently low after scanning the results, the searcher may choose not to impose the remaining conditions to the search unless high precision performance is a search objective.

In search topic #2, "4-H Clubs, their members and activities," the search formulation is comprised of variant spellings of the club. Since 21 citations are retrieved using free text and 14 citations searching the identifier field, the search is terminated without applying the MEMBERS or ACTIVITIES aspect of the search as the final set, in both cases, is sufficiently small.

If there had been too many citations after searching the most specific facet, then the next most specific facet would be searched and combined in an AND relationship with the results obtained with the first facet. The resulting intermediate result may now be small enough that there is no need to impose the rest of the search conditions. This approach can be more efficient than the full building block model when a search topic has some very specific facets with low postings.



LOWEST POSTINGS FACET FIRST APPROACH

5. Lowest Postings Facet First

The fifth approach starts a multi-faceted search with the facet that is estimated (e.g., from the term frequency search aids, 8th edition Thesaurus of ERIC Descriptors, or from experience) to have the smallest number of postings. If the postings are sufficiently low there may be no reason to continue searching additional facets. For example, a searcher may safely assume that the facet GIRL SCOUTS OF AMERICA derived from the topic

"Success rates in higher education of students who were members of the Girl Scouts," has fewer postings than the facet HIGHER EDUCATION. Since the search for the facet GIRL SCOUTS results in less than 20 citations, the searcher terminates the search before applying the second facet, HIGHER EDUCATION, to the formulation.

Summary

There are other approaches to interactive searching, and of course, it is always possible to work with combinations of the above approaches. There is little in the way of solid theory or guidelines regarding how a search should be formulated.

STEP 4

COMPILING THE SEARCH TERMS

Before going online, some check of word lists and thesauri will help insure that the search terms used will lead to useful results. Both the controlled vocabulary of a database (indexing records in descriptor/identifier fields) and the free text (subject-conveying fields other than descriptor and identifier fields) are possible sources of search terms.

1. Search Terms in Descriptor and Identifier Fields

In the ERIC database, the descriptor and identifier fields contain terminology which has been assigned by ERIC clearinghouse staff. The Thesaurus of ERIC Descriptors, an example of a controlled vocabulary, is used by the indexer in ERIC clearinghouses. If the Thesaurus is also used by the searcher, the intellectual effort required to compile search terms can be reduced as it serves as a control on variant word forms, synonyms and homographs. For example, the ERIC Thesaurus suggests a number of related search terms to represent the concept of violence, i.e., Crime, Aggression, Antisocial Behavior, Delinquency, and Emotional Response, as well as the descriptor, Violence.

The identifier field contains names of persons, places, things or proper names that are important terms associated with the item. A semi-controlled vocabulary, identifiers are published periodically in an alphabetical list[1] similar to the alphabetical section of the Thesaurus. There are rules for the creation of new identifiers so that terms are developed according to standards to minimize variant forms.

2. Free Text Searching

The free text searching capability of DIALOG allows for the scanning of all subject-conveying fields of the ERIC record: title, abstract, descriptor, and identifier. If a concept like parapsychology is not found in the Thesaurus of ERIC Descriptors, terms synonymous with parapsychology can be gathered from such lexicographic sources as the Identifier Authority List, Thesaurus of Psychological Index Terms, Roget's Thesaurus, or an unabridged dictionary. This list of search terms compiled from sources other than the ERIC Thesaurus can be searched as free text in all or a specified number of subject-conveying fields; however, recall scores may be low if only a single subject-conveying field is searched.

---

[1] Identifier Authority List. Bethesda, MD: ERIC Processing and Reference Facility, 1980- .

As citations are retrieved using this free text scan method, a few citations can be called up for online review to note how relevant citations are indexed. These descriptors and other free text terms can be used in further search formulations. This method of gathering additional search terms resembles the "citation pearl growing" approach to the formulation of search logic discussed in the previous step of this section. Titles of known relevant items are also a rich source of "free text" search terms.

3. Online Alphabetic and Rotated Word Lists and Thesaurus

When a planned search has several terms associated with it that occur close together alphabetically, it is fast and convenient to review the online dictionary (an alphabetic list of words in all the searchable fields of the ERIC database). Rather that directly keying-in the search terms in a series of SELECT commands, the EXPAND command is used. Additional terms may appear which had not been considered previously.

When searching corporate sources and author names, it is especially helpful to access the online alphabetical word list in order to avoid the typing errors which may occur when keying-in specific names, as well as to gather variants of names.

Scanning the online thesaurus, i.e., the subject-related descriptor list, may suggest to the searcher during the online activity search terms which do not appear in alphabetic proximity. The postings for each term are given and this data can affect the search strategy being considered. Heavily posted terms may be selected after reviewing the EXPAND display of a lightly posted term, for instance, or vice versa. These strategies are discussed in the previous step. However, selecting a phrase from the online thesaurus or alphabetic word list restricts retrieval to occurrences of the phrase as a multi-term descriptor or identifier. Retrieving single and multiple word search terms from all subject-conveying fields is covered in more detail in step 6.

The online rotated descriptor word list contains terms from all searchable fields of the ERIC Unit Record.* Its greatest value is evident when the search formulation requires many controlled vocabulary terms containing a common root word. Accessing the online rotated word list, the searcher can SELECT descriptors and identifiers from the display that contains the root. For example, a search facet on SPECIAL LIBRARIES can be satisfied by EXPANDing and SELECTing pertinent descriptors from the online rotated display under Libraries, i.e., EXPAND ZZ=LIBRARIES. In this way, the searcher can SELECT terms from the online display, e.g., Hospital Libraries, Law Libraries, Prison Libraries, etc., instead of typing in descriptor phrases individually.

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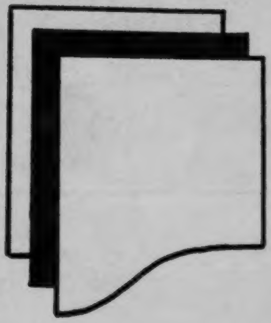
*See pages 146-167 in the appendix.



STEP 5

ORDERING OUTPUT

Ordering output does not occur as a single, isolated event in the sequence of online search activities. Since decisions influenced by output specifications are made throughout the search process, the actual activity of ordering output is not performed at any fixed moment during the online search. As soon as the searcher begins formulating search strategy, the construction is affected by conditions imposed by the requestor concerning output specifications, e.g., size of output, document type, or year of publication.

For example, in order to fulfill the request of an information seeker who desires a small amount of output with a high percentage of relevant items, the searcher may select the "citation pearl growing" approach to search strategy. The LIMITALL command may be preferred by a searcher who must restrict the results by publication date. In another instance, the Briefsearch and a shortened online print format may be favored when the information seeker is hampered by time restrictions and requires immediate results; a more comprehensive search may be performed at a later time.

Just as ordering output influences the planning of search strategy (step 3 in the process of online searching), it affects the conceptualization of the search as input to the retrieval system (step 4). If the information seeker is concerned about retrieving all relevant citations at a minimum cost, the searcher is compelled to select an approach which will result in high recall, and formulate the strategy employing time-saving devices, e.g., EXPAND and range SELECT, low activity search time, or pre-search offline preparation to minimize online "think" time.

Output can be scanned online for fine tuning or for further trimming of the search results on the basis of non-subject parameters. For example, the resultant set may exceed the output size requested by the information seeker so that the searcher, depending upon policy, personal judgment, or consultation with the requestor, may decrease the size by applying limiting criteria such as language, date or type of publication, availability, or sponsoring agency. These specifications are in most cases applied to an existing set. The decision to trim the output may be the outcome of the preliminary evaluation (step 7), in which the search results are reviewed to determine whether the search strategy satisfies the search objective.

The retrieval system and/or database plays a role in determining characteristics of the output. Since the sorting criteria vary among databases, the format of output differs from database to database in DIALOG. For ERIC, DIALOG offers alphabetical sorting of records by author, corporate source, journal name, or document title.

In summary, search output can be limited by criteria imposed by the information seeker, searcher, or retrieval system. The influence of ordering output prevails throughout the search process; however, ordering output, as a step in the process of online searching, exists as a concrete and very real activity that may occur at a number of points during online interaction.

STEP 6

CONCEPTUALIZING THE SEARCH AS INPUT TO THE RETRIEVAL SYSTEM

The features of any computerized retrieval system influence the way in which a given search is formulated for that system. Only a few of the operations which can seriously affect search strategy operations are described briefly below. For a more complete description, see Guide to DIALOG Searching (1979); C. Bourne, DIALOG Lab Workbook (3rd edition, 1981); or relevant issues of DIALOG's monthly newsletter, Chronolog.

1. SuperSELECT and Single Term Combinations

DIALOG's SuperSELECT capability unites the features of the SELECT and COMBINE commands so that a full Boolean expression can be entered in a single search statement. For example, searchers employing the "citation" word proximity operator and the sequential SELECT and COMBINE commands achieve the same results as the search employing SuperSELECT in the following search topic, "The effects of TV violence on children":

Sequential Search Formulation	Word Proximity Search Formulation	SuperSELECT Search Formulation
1 S CHILDREN	1 S CHILDREN(C)TELEVISION (C)VIOLENCE	1 S CHILDREN AND TELEVISION AND AND VIOLENCE
2 S TELEVISION		
3 S VIOLENCE		
4 C 1-3/AND		

One disadvantage of the word proximity and SuperSELECT formulations above is that they do not provide any intermediate sets. To obtain intermediate steps, the SELECT STEPS enhancement of SuperSELECT is called upon, as in the example below:

SuperSELECT STEPS Search Formulation in File 201

```
1 SS CHILDREN AND TELEVISION AND VIOLENCE
       1  45070 CHILDREN
       2    801 TELEVISION
       3     81 VIOLENCE
       4     13 1 AND 2 AND 3
```

In this manual, the formulations of ERIC ONTAP searches are constructed using the SuperSELECT STEPS command. The results obtained with this command allow the searcher to revise the formulation using the sets created by intermediate steps. Otherwise, the searcher must re-enter the search terms and logic if the SuperSELECT command is used without the STEPS feature.

The SuperSELECT STEPS command can be used with truncated search terms:

```
1 SS CHILD? AND TELEVISION? AND VIOLEN?? ?
```

and/or nested Boolean operators:

```
1 SS CHILDREN AND (TV OR TELEVISION?) AND VIOLENCE
```

and/or suffix-coded field limiters from the basic index:

```
1 SS CHILDREN/TI,DE,ID AND (TV OR TELEVISION?) AND VIOLENCE/TI,DE,ID
```

and/or prefix-coded search elements from the additional indexes:

```
1 SS PY=1975 AND (CHILDREN AND (TV OR TELEVISION?) AND VIOLENCE)
```

and/or set numbers and search terms:

```
5 SS S3 AND S4 AND (VIOLEN? OR AGGRESSION OR CRIME? ?)
```

and/or set number ranges and search terms:

```
5 SS S3-S4/AND AND (VIOLEN? OR AGGRESSION OR CRIME? ?)
```

and/or colon range searching:

```
5 SS PY=1975:PY=1978 AND (CHILDREN AND TELEVISION? AND VIOLENCE)
```

2. SuperSELECT and Multiple-Word Search Terms

In the case of single word search terms, DIALOG scans all subject-conveying fields of the ERIC record, i.e., title, abstract, descriptor and identifier, by default unless otherwise directed by the searcher. Multiple-word terms entered by the searcher are only checked against the entries from the descriptor or identifier fields. Searchers restricting their searches to the controlled vocabulary fields of the ERIC record (descriptors and identifiers) are ignoring other subject-conveying items of the record. High recall is achieved when the searcher uses both the controlled vocabulary and free text. Searching can be extended to all subject-conveying fields simply by using the adjacency feature (W) as shown below.

Search Formulation in File 1	Result	Effect
S BOOK CATALOGS	103	Searches in descriptor and identifier fields for subject headings that include the character sequence, BOOK CATALOGS.
S BOOK(W)CATALOGS	118	Searches as above, plus title and abstract fields for the occurrence of this character string.

The use of the word proximity feature in this way generally retrieves about 20 percent more postings than are retrieved by searching fields with assigned index terms. The significant increase in postings results in a high recall search. But remember, more computer time is spent using word proximity, expecially for high posting combinations like ELEMENTARY(1W)EDUCATION.

There are many instances in which the controlled vocabulary does not yet include current expressions that may appear in the literature. The word proximity feature can help find these citations by means of direct text searching as in the following examples:

A. Search by Controlled Terms in File 1	Results		B. Word Proximity Free Text Search in File 1
	A	B	
S TAXPAYER REVOLT	0	9	S TAXPAYER(W)REVOLT
S ZERO BASED BUDGETING	5	70	S ZERO(1W)BUDGETING
S ONLINE CATALOGS	0	7	S ONLINE(W)CATALOGS
S BACK TO BASICS	61	262	S BACK(1W)BASICS
S GENERATION OF ALTERNATIVES	0	3	S GENERATION(1W)ALTERNATIVES

The SuperSELECT command can be used to enter multiple-word search terms in the same way as single-word search terms are entered. For example, SuperSELECT commands can contain bound descriptor phrases:

```
1 SS (ANTISOCIAL BEHAVIOR OR VIOLENCE) AND TV AND CHILDREN
```

and/or free text search phrases:

```
1 SS (ANTISOCIAL(W)BEHAVIOR OR VIOLENCE) AND TV AND CHILDREN
```

and/or truncated free text search phrases:

```
1 SS (ANTISOCIAL(W)BEHAV? OR VIOLENCE) AND TV AND CHILDREN
```

and/or free text search phrases with field limiters:

```
1 ANTISOCIAL(W)BEHAV?/DE,ID,TI OR ANTI(W)SOCIAL(W)BEHAV?/DE,ID,TI
```

and/or free text search phrases with set numbers:

```
5 SS ANTISOCIAL(W)BEHAVIOR AND S1 AND S2-S4/OR
```

The SuperSELECT command permits the entry of 240 or fewer characters. Even the best typist can expect mistakes from time to time, especially when entering long and complex statements. Thus, prefer the SuperSELECT STEPS command so that intermediate steps can be used when revising or correcting formulations.

DIALOG's SuperSELECT command has many advantages:

- A search formulation that resembles natural language.
- The creation of a multi-faceted search in a single statement.
- Display of intermediate sets which help the searcher to revise or correct the ongoing formulation.
- Mixtures of controlled vocabulary, free text search terms and phrases, and prior sets in a single search statement.
- The use of field limiters and/or truncation and/or word adjacency.
- Fewer commands in a single search statement.

3. Storage-Saving Techniques to Bypass Computer Memory Limitations

The search formulation can be influenced by the amount of working storage available to the searcher. About one million postings per search are available to each searcher. Computer memory limitations pose less of a problem in the ERIC file than in large files such as BIOSIS or AGRICOLA. Since problems do occur, certain formulation strategies can be used to reduce the amount of storage space needed. Storage-saving techniques that can be used are:

(a) Avoidance of intermediate logical formulations.

(b) Stem search.

(c) EXPAND and range SELECT.

(d) Word proximity feature.

(e) LIMIT feature.

(f) BEGIN, resetting set numbers to zero.

(g) Search Save.

(a) Intermediate results of COMBINE operations that are stored online take up space in the same way as the other sets. Combining all the logic in one statement reduces storage space. Consider the following example in which the same search objective is met two different ways, but with differences in the total amount of working storage space required:

<u>Search Plan in File 1:</u> (TEST? OR EVALUATE? OR ANALY?) AND (READING OR MATHEMATICS)

```
Formulation A                          Formulation B

1   60,197 S TEST?                     1  60,197 S TEST?
2   81,076 S EVALUAT?                  2  81,076 S EVALUAT?
3   80,220 S ANALY?                    3  80,220 S ANALY?
4  168,205 C 1-3/OR                    4  35,534 S READING
5   35,534 S READING                   5  18,194 S MATHEMATICS
6   18,194 S MATHEMATICS               6  23,422 C (1OR2OR3) AND (4OR5)
7   50,736 C 5-6/OR                    (298,634 postings in working storage)
8   23,422 C 4 AND 7
 (517,584 postings in working storage)
```

Performing the same search two different ways requires a difference of 131,139 postings in working memory, which could be important for some searches. The preferred practice is to <u>avoid the intermediate logical operations</u> if a storage overflow problem is anticipated.

(b) If a word is sufficiently unique, the <u>use of a word stem</u> instead of the combination of a series of terms might save a small amount of storage space, because an intermediate logical operation might be avoided through the implicit OR operation performed in the stem search. Consider the following example in which the same search objective is met two different ways:

```
Formulation A in File 1                 Formulation B in File 1

1  16,373    S EVALUATE                 1  81,076     S EVALUAT?
2   5,949    S EVALUATED                  (81,076 postings in working storage)
3   7,169    S EVALUATING
4  70,188    S EVALUATION
5   4,278    S EVALUATIONS
6   3,072    S EVALUATIVE
7  80,196    C 1-6/OR
 (177,225 postings in working storage)
```

In formulation B, over 96,000 storage spaces have been saved by using stem searching. The preferred practice is to use the word stem when the word is sufficiently unique not to cause too many false drop problems.

(c) The EXPAND and range SELECT feature can be very helpful with storage problems because of the implicit OR operation that is done with the range SELECT feature. This can be done for both the alphabetically-related terms and the thesaurus-related terms. In the following example, the same search objective is accomplished in two different ways:

Search Plan in File 1: (AUDIOVISUAL EQUIPMENT OR FACILITIES) AND
(LIBRARIES of all types)

Formulation A

```
 1   10,625 S TELEVISION
 2    6,546 S FILMS
 3    5,652 S AUDIOVISUAL AIDS
 4    5,746 S EDUCATIONAL MEDIA
 5    1,714 S AUDIOVISUAL INSTRUCTION
 6    1,500 S SLIDES
 7    1,227 S TAPE RECORDINGS
 8      970 S INSTRUCTIONAL FILMS
 9      843 S EXHIBITS
10      901 S VISUAL AIDS
11      325 S PROJECTION EQUIPMENT
12      455 S CARTOONS
13      248 S VIDEOTAPE CASSETTES
14       27 S AUDIOTAPE CASSETTES
15      211 S MAGNETIC TAPE CASSETTES
16      103 S SCREENS
17       94 S REALIA
18       50 S MICROPHONES
19   27,702 C 1-18/OR
20    2,140 S LIBRARIES/DF
21    4,390 S LIBRARY SERVICES
22    2,022 S PUBLIC LIBRARIES
23       84 S COUNTY LIBRARIES
24    9,857 S LEARNING RESOURCES CENTERS
25    1,298 S SCHOOL LIBRARIES
26    1,004 S INFORMATION CENTERS
27      726 S SPECIAL LIBRARIES
28      530 S ARCHIVES
29      396 S STATE LIBRARIES
30      374 S RESEARCH LIBRARIES
31      289 S NATIONAL LIBRARIES
32      384 S ACADEMIC LIBRARIES
33       52 S BRANCH LIBRARIES
34    2,284 S COLLEGE LIBRARIES
35      167 S FILM LIBRARIES
36      143 S GOVERNMENT LIBRARIES
```

Formulation B

```
1  45,650  E(AUDIOVISUAL AIDS)
           SR5,R7-R13,R15-R27,
           R29-R46
           EZZ=LIBRARIES
2   7,093  SE7-E25
3     859  C1 AND 2
  (53,602 postings in working
   storage)
```

```
37        2 S HOSPITAL LIBRARIES
38      157 S INSTITUTIONAL LIBRARIES
39       83 S LAW LIBRARIES
40      260 S MEDICAL LIBRARIES
41       18 S PRISON LIBRARIES
42      186 S REGIONAL LIBRARIES
43   11,936 C 20-42/OR
44    1,646 C 19 AND 43
    105,367 postings in working storage)
```

In this example the EXPAND/SELECT approach saved over 50,000 postings in working memory. Moreover, formulation A took more time to type, increasing online connect time and increasing the possibility of typing errors.

(d) The word proximity feature and SuperSELECT command discussed earlier in step 6 do not provide any intermediate sets. If the searcher intends to revise the formulation during the online interaction, using word proximity or the SuperSELECT command as a means to bypass computer memory limitations is not suggested. However, word proximity and SuperSELECT may be suitable to express a Briefsearch when there is <u>no need for intermediate sets</u>. Note in the following example on the effects of TV violence on children that over 70,000 postings are saved using word proximity or SuperSELECT.

```
Formulation A in File 1                  Formulation B in File 1

1  58,303  S CHILDREN                    1  208    S CHILDREN AND TELEVISION
                                                     AND VIOLENCE

2  10,625  S TELEVISION                     (208 postings in working memory)

3   1,598  S VIOLENCE                                OR

4     208  C 1-3/AND                     1  208    S CHILDREN(C)TELEVISION
                                                     (C)VIOLENCE

  (70,734 postings in working memory)      (208 postings in working memory)
```

(e) Use the BEGIN command when doing several unrelated searches at the same terminal session. This resets set numbers to zero, and clears all of your working storage space, thus starting subsequent searches with a full allocation of working storage.

(f) The LIMIT feature can be used to do some tasks that might otherwise require more storage when done with set combinations. This is particularly true when restricting the search output to accession year or document type, as shown in the following example:

Search Plan in File 1: (VOCATIONAL TRAINING) AND (ERIC accession YEAR = 1975 or more recent)

Formulation A	Formulation B: LIMIT Command
1 16,447 S VOCATIONAL(W)EDUCATION	1 16,447 S VOCATIONAL(W)EDUCATION
2 104,763 S PY=1974:PY=1976	2 2,366 LIMIT1/080788-127413/ED
3 3,629 C 1 AND 2	3 1,154 LIMIT1/082165-142252/EJ
(124,839 postings in working storage)	4 3,520 C 2-3/OR AND 1
	(23,487 postings in working storage)

In this case, the most convenient and fastest technique for the searcher is to use the PY= feature instead of looking up and keying-in the ED- and EJ- number ranges for reports. On the other hand, over 100,000 storage positions have been saved using the ED- and EJ- number ranges.

When storage problems are anticipated, the LIMITALL feature can be used to partition the file by accession number or document availability. The search is performed on the portion of the file specified in the LIMITALL command. Using the search plan above, the LIMITALL capability is demonstrated below:

Search Plan in File 1: (VOCATIONAL EDUCATION) AND (ERIC accession YEAR = 1975 or more recent)

Formulation C: LIMITALL Commands	Comments
LIMITALL/095254-999999/ED	The LIMITALL command restricts the file to 1975+ ERIC non-journal accessions.
1 6,720 S VOCATIONAL(W)EDUCATION	Occurrences of the descriptor phrase are retrieved from this partitioned file.
LIMITALL/101873-999999/EJ	The new LIMITALL command cancels the first command.
2 2,422 S VOCATIONAL(W)EDUCATION	
3 9,142 C 1-2/OR	
LIMITALL/ALL (18,284 postings in working memory)	The LIMITALL command is removed in this way to permit searching in the entire File 1.

Although the LIMITALL feature keeps the number of postings in the working memory at a minimum, when comparing the results of the three strategies above, one disadvantage of the LIMITALL feature is apparent: the searcher is required to repeat the search statements (in the above example, one phrase, VOCATIONAL(W)EDUCATION, is entered twice) if both the journal and non-journal citations are desired. However, LIMITALL is a powerful storage-saving device if one of the output specifications is year of publication or ERIC document type.

(g) The Search Save is the most powerful storage-saving technique of all. A search save can be prepared and saved for frequently occurring facets and EXECUTEd when needed. An example of its use is shown in the sample formulation below:

Search Plan in File 1: (READING OR READER) AND (ELEMENTARY OR SECONDARY EDUCATION)

Search Save Formulation	Comments
1 55,041 S ELEMENTARY(1W)EDUCATION	1W provides for retrieval of items indexed under Elementary Secondary Education as well as Secondary Education.
2 61,752 S SECONDARY(W)EDUCATION	
3 35,534 S READING	
4 6,694 S READER?	
5 13,445 C (3 OR 4) AND (1 OR 2)	
END/SAVE	The Search Save command--END/SAVE--concludes the routine. DIALOG assigns a serial number to the Search Save and the searcher can resume searching.
(172,466 postings in working memory)	

```
SERIAL#1PAC
     20MAY81  8:52:56 USER 4111
$0.00 0.046 HRS FILE1 00 DESCRIPTORS
$0.37  TYMNET
$0.37  ESTIMATED TOTAL COST
```

Search Plan in File 1: (READING OR READER) AND (ELEMENTARY OR SECONDARY EDUCATION) AND COSTS

Formulation	Comments
.EXECUTE 1PAC	The Search Save is recalled and performed by the system at the signal of the .EXECUTE command.
22,793 ELEMENTARY(1W)EDUCATION	The system responds to the .EXECUTE command by printing the results of the final combination of search statements. The Search Save results in 13,445 postings in working memory.
30,804 SECONDARY(W)EDUCATION	
25,949 READING?	
4,458 READER?	
6,898 C (3 OR 4) AND (1 OR 2)	

Formulation (cont.)			Comments
1	13,445	SERIAL# 1PAC	
2	9,423	S COSTS	The third facet, COSTS, is applied to the formulation and combined with the Search Save result.
3	154	SS COSTS AND S1	

In the example above, the 172,466 postings required to construct statements 1-5 of the Search Save are reduced to 13,445 postings when the searcher executes the Search Save. The results of the Search Save are then combined with the third facet, COSTS, input by the searcher.

Such a search tactic can be temporarily constructed and used during a single terminal session by calling upon the END/SAVE TEMP command. The Search Save has the effect of eliminating all temporary storage space for the development of the two facets READING and EDUCATION, and can then be released as soon as the rest of the search has been completed.

It should be noted that the Search Save approach can help with the storage problem, but extra computer time is required to reprocess separately the search steps which comprise the saved search. When intermediate sets of the formulation are wanted, the EXECUTE STEPS command is preferred.

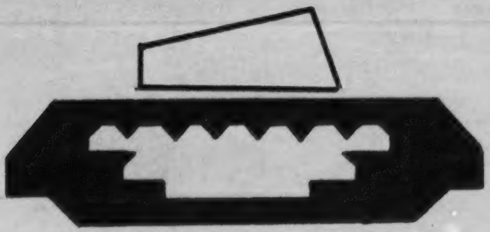
The appendix to this report includes some Search Saves for common educational level facets. The procedure for recalling and exchanging these Search Saves between work spaces is covered in the introduction to the appendix.

4. Searching during Low Activity Times

To reduce the cost of searching, the search should be performed during the system's low activity hours. Most online search systems have a response time, and hence a total search time, that depends upon the volume of processing activity that is taking place at that time. The greater the number of simultaneous searches, the slower the response time. Searches done during the 8-2 (PST) time slot are generally slower, since all U.S. time zones are in the course of their normal working day. Search speeds for the same search can sometimes differ by a factor of 2, depending upon the time of day that the search is made. A search that takes five minutes to run at 3 pm (PST), during the low activity period, could sometimes take 10 minutes to run at noon (PST), a high activity period.

STEP 7

EVALUATING PRELIMINARY RESULTS



Fundamental to the evaluation of the search strategy is the question, "How well is the search formulation meeting the information need?" If it is determined in the original interview that the information seeker wants high recall, then an appropriate performance measure would be a check on the fraction of relevant citations in the file that are actually retrieved by the search. If the objective is only a few relevant items at a low cost to the information seeker, then search time would be an important measure and a Briefsearch may be satisfactory if some relevant items are retrieved. While online, the searcher should monitor the search in progress and check on results. This check may require a change in strategy and overall approach to the search. A review of Steps 1-6 may be necessary.

STEP 8

EVALUATING FINAL RESULTS

There is no single measure of how good a search is. Performance measures such as cost, recall, and precision can be applied to the search results given the specific search objectives:

Search Objective	Useful Performance Measures
• To retrieve all (or as many as possible) relevant citations in file.	Recall (defined as percent of relevant citations in the file that are actually retrieved).
• To reduce (or keep low) the number of non-relevant citations retrieved.	Precision (defined as percent of retrieved citations that are relevant).
• To keep costs low and to retrieve some relevant citations.	Cost (defined as connect time and cost of offline printing).

1. Recall

Recall is easy to define, but very difficult to measure because it is so hard to find out the total number of relevant citations that are in the file.*

Certain tasks can be performed in order to achieve high recall. A search done on both assigned index fields and titles will generally return more citations (total and relevant) than a search done on either of these fields alone. The larger the total number of subject fields of the bibliographic records being searched, the larger the total number of returned citations.

2. Precision

Precision, sometimes called relevance, is easy to understand and easy to measure. Whereas recall increases as more parts of a citation are searched, conversely, precision decreases as more parts of a citation are searched. If a low volume, high precision search is desired, searching the title, major descriptors, and major identifiers delivers a high percentage of relevant items.

---

*The search questions provided in the next section have all been searched several times by several different people, and the output reviewed, so that there is a fairly good idea of what citations in the file are relevant to each of the questions. This information has been stored away as answer sets, so that it can be retrieved to permit the practice searcher to compute recall.

3. Cost

Connect time or computer cost is also easy to understand, and easy to measure because the accounting information is provided as part of each search output by the use of the BEGIN, END, .COST or LOGOFF commands. Using the time-saving schemes that have been described in Step 6 can serve to aid the searcher who desires to lower costs of online searching.

SECTION II

ERIC ONTAP EXERCISES FOR SELF-IMPROVEMENT OF ONLINE SEARCHING

INTRODUCTION TO DIALOG'S ERIC ONTAP (FILE 201)

ERIC ONTAP is a collection of RIE and CIJE citations from the 1975 ERIC file. Its contents correspond to citations in all 1975 printed ERIC indexes, not necessarily to a 1975 publication date, and include the range of ERIC accession numbers EJ 101 873 to EJ 121 926, and ED 095 254 to ED 110 594. ERIC ONTAP is exactly the same in all respects (data elements, searchable fields, etc.) as the 1975 accessions in the regular DIALOG ERIC file (File 1).

The 35,400 items in ERIC ONTAP represent eight percent of the total ERIC database (approximately 425,000 items). There are two points to remember when using this file:

1. Since the file is small, you will not encounter problems involving size, e.g., what to do when you still have a large number of postings in your final set.

2. The eighth edition of the Thesaurus of ERIC Descriptors was used to index Files 1 and 201. Originally, the seventh edition of the ERIC Thesaurus was used to index File 201 and seven editions of the ERIC Thesaurus were used to index File 1. In 1980, the ERIC database and ERIC ONTAP were loaded in DIALOG after a complete update of indexing terminology to conform to the eighth edition of the ERIC Thesaurus. Thus, what was a valid descriptor in the seventh edition may not be a valid descriptor in the eighth edition. The "old" descriptor remains in the printed ERIC Thesaurus and provides a cross-reference to the "new" or preferred term, which includes the postings of the "old" term.

The unusual feature of the ERIC ONTAP file is that it contains "answer sets" (lists of ERIC accession numbers) to predetermined queries. Searchers using this file can perform a search for the query and compare their results with the "answer set" for that query.

The search queries represent real, not synthetic questions, since they are assembled from questions posed to reference librarians and ERIC clearinghouse searchers. Level of difficulty varies from query to query, and they are graded as simple, moderate, and difficult. "Named object" queries, e.g., 4-H Clubs, or the 16 Personality Factor Test, are the easiest to perform, but they involve problems for the online searcher which, if worked out, will help in more complex search formulations.

This section of this manual includes 16 of the 29 queries in the ERIC ONTAP file. For demonstrations or workshops, searchers may want to use specific queries to show how online searching of the ERIC database can be performed and to point out how differences in search strategy retrieve different output.

Each query in this section will include various search formulations with explanations. The way in which the searches are executed will vary somewhat from what would likely be seen in actual practice. This is done solely for clarity of presentation. It is assumed that the searcher will be working in an interactive manner, using EXPANDs, reviewing sample citations, and restructuring the strategy as working results are obtained. Sample search formulations are given here to show the critical elements of the final formulation and to emphasize how a change in search objective (i.e., high recall, high precision, Briefsearch), can affect retrieval results.

In many cases, the search formulations given for each query are composites that were assembled with the benefit of hindsight after viewing the results of several formulations. (Executing the "perfect search" at one sitting is still an elusive goal.)

The "answer set" is a list of ERIC documents that are judged to be relevant to the topic, which are cited by ERIC accession number. The set can be selected online by using the answer set number, e.g., S AN=D05. Relevance judgments for each query are made on the basis of the total record in ERIC ONTAP, not on the basis of examination or analysis of the full document or article, and are open to question and modification. Broad review publications, e.g., bibliographies of dissertations in education, are not judged as relevant unless there is specific mention of the search topic in the abstract.

Since the list of relevant citations, the "answer set," is compiled from the results of several searches on each topic, it represents an approximation to the total number of relevant citations contained in the entire ERIC ONTAP file. (There may be additional relevant citations in the file for most of these questions. We would appreciate hearing about them from those of you who find them.)

For each query in this section, one search formulation, specifically designed as a high recall search, retrieves all the relevant citations listed at the conclusion of the discussion. In addition, one search formulation, in most cases, is singled out as being preferred in the light of the information need and search objective stated in the query description. Almost every search topic features a formulation constituted with high precision in mind.

You, the reader/searcher, should try your own search strategies and compare your output and your choice of search vocabulary with that of the high recall search.

A Briefsearch is also given for almost every query. Searchers might try to formulate their own Briefsearches with the intent of searching DIALINDEX. Briefsearches entail ONE search statement, i.e., the approach required by DIALINDEX searches.

All of the approaches to search formulation, e.g., building block, most specific aspect first, etc., are covered in one or more queries. For example, the stated search objective accompanying the query on "Parapsychology" requires high recall. Consequently, the formulation which achieves high recall is selected as the preferred routine. Do remember, however, that no single search strategy or approach to search formulation is deemed the best <u>in all cases</u>.

To obtain an explanation of the features of the ERIC ONTAP file, execute a BEGIN 201 command. Typing ?FILE201 or ?ONTAP201 produces the following directions:

```
      ?FILE201
FILE201:  ONTAP ERIC.
THE ONTAP FILE FOR THE ERIC DATABASE
PROVIDES TEST QUESTIONS AND RELEVANT
CITATIONS FOR EACH QUESTION.  THE 1975
ERIC FILE IS THE SOURCE OF THE ANSWER
SETS. QUESTIONS AND ANSWER SETS ARE
LABELLED AS TO COMPLEXITY, E.G., AN=S03,
AN=M04, AN=D03 DENOTE THE ANSWER SETS
FOR THE 3RD SIMPLE, 4TH MEDIUM AND 3RD
DIFFICULT QUESTION.  AFTER FINISHING THE
SEARCH, THE PERFECT ANSWER SET FOR THAT
QUESTION CAN BE SELECTED BY COMMANDS OF
THE FORM 'SELECT AN=S03', AND SELECTED
ANSWER SETS CAN BE COMBINED IN AN AND
RELATIONSHIP WITH YOUR FINAL SEARCH SET
TO FIND OUT HOW MANY RELEVANT CITATIONS
YOU FOUND.  A COMMAND /EVAL COMPUTES THE
RECALL AND PRECISION OF YOUR SEARCH.
ooSEE ?TAPSAM FOR SAMPLE SEARCH SEARCH.
      ?TAPSIM FOR LIST OF SIMPLE QUESTS.
      ?TAPMED FOR LIST OF MEDIUM QUESTS.
      ?TAPDIF FOR LIST OF DIFFICULT ?'S.
      ?EVAL FOR EXPLANATION OF PREC/REL.
OFFLINE PRINTS CANNOT BE REQUESTED IN
FILE 201 AND THE SEARCH.SAVE FEATURE IS
NOT APPLICABLE.  COST OF SEARCHING IS
$15/CONNECT HOUR.
ooSEE ALSO ?FIELD201 AND ?LIMIT201.
```

There are additional instructions which explain features of ONTAP in greater detail. Instead of listing these texts below, they are given as needed in discussions of the search queries which follow.

It is suggested that you start by trying the first query on "Parapsychology." Read the text, develop your own strategy, and perform an online search. Then figure the recall and precision ratios of your performance; this can be done by comparing your output with the list of ERIC accession numbers given in this workbook, or, selecting the answer set for the particular query and using the /EVAL command available in the ERIC ONTAP file. The /EVAL command will automatically compute your recall and precision ratios.

The discussions of the Parapsychology query and the fifteen other topics are arranged according to steps 3 to 8 of the online searching process outlined in Section I. The steps are summarized below:

Step 3. Formulating basic search logic--planning search strategies.

Step 4. Compiling the search terms.

Step 5. Ordering output.

Step 6. Conceptualizing the search as input to the retrieval system.

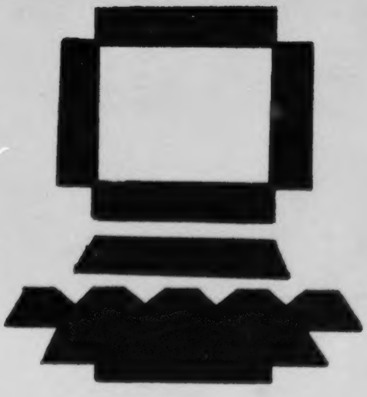
*Step 7. Evaluating the preliminary results.

Step 8. Evaluating the final results.

*Since step 7 affects search formulation and occurs during the online interaction, the discussion of this step is treated, for the most part, in the Comments section of search formulations.

We recommend that you begin the ONTAP exercises with the first query on Parapsychology. The discussion of this query focuses on both the steps of the online searching process and the procedures for using ERIC ONTAP. The discussion of Parapsychology will familiarize you with the features of the ONTAP file so that you can prepare your own search strategy. The remaining queries follow the same pattern of discussion, but the instructions for online features of the ONTAP file are not covered in as much detail in subsequent discussions.

47



SAMPLE SEARCH TOPIC

PARAPSYCHOLOGY

Topic: Parapsychology. (S AN=S09)

Search Objective: All information in ONTAP on this topic.

Step 3. Formulating Basic Search Logic--Planning Search Strategies

The search topic, Parapsychology, is depicted by a single concept or facet. The term Parapsychology, its variant forms and synonymous terms--e.g., ESP, Psychic, Extrasensory--are incorporated into the search strategy. All terminology chosen to represent the facet are joined together by the use of the OR operator, thus forming a single facet.

Step 4. Compiling the Search Terms

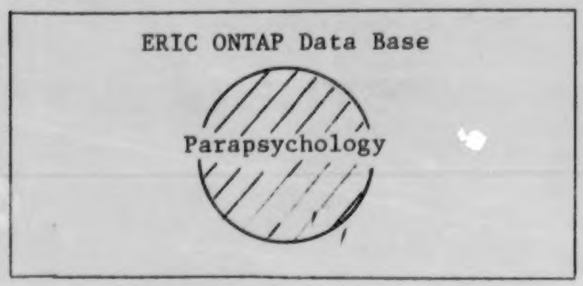
Usually the search terms will come from the ERIC Thesaurus; however, in this case, Parapsychology is not an ERIC descriptor, nor are such related terms as ESP, psychic, and extrasensory. Consequently, other aids for collecting searching vocabulary may be consulted, such as the Identifier Authority List, Roget's Thesaurus or Thesaurus of Psychological Index Terms. Since no ERIC descriptors describe the concept of PARAPSYCHOLOGY, searching only the descriptor field of the ERIC record would be useless. However, the identifier field of ERIC resumes may contain these terms since it is comprised of terminology which has been assigned to the document by ERIC clearinghouse staff in order to indicate the document's intellectual content.

Step 5. Ordering Output

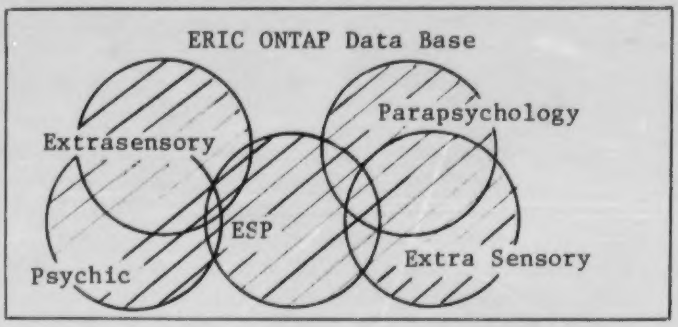
There is no mention concerning limiting the output by publication type, availability, etc. When selecting an approach to search strategy, the searcher must take into consideration the search objective, to retrieve all information on this topic. In this case, a high recall formulation is preferred; moreover, the searcher should make every effort to compile a comprehensive list of search terms in order to meet the search objective.

Step 6. Conceptualizing the Search as Input to the Retrieval System

Search strategy is illustrated in the following diagram. The rectangle contains all records stored in the ERIC ONTAP database. A shaded circle is used to represent the set of documents in which the concept parapsychology occurs.



In the next diagram, the shaded circles indicate not only the sets of documents formed by search terms, but the retrieved portion of the database. The illustration depicts formulation #1 in which the controlled vocabulary fields are scanned for the occurrence of the search terms.



Searching the assigned index term fields is limited to the identifier field since there are no ERIC descriptors to represent the concept. The title field is also searched since its contents often describe the intellectual content of the document.

Formulation #1	Comments
1 SS PARAPSYCHOLOGY/ID,TI OR ESP/ID,TI OR PSYCHIC/ID,TI	DIALOG's SuperSELECT capability allows us to enter and combine several search terms in a single command.

Since the search objective is to retrieve all information on this topic, formulation #2 is constructed to search all fields containing subject describing words and phrases. This strategy utilizes the "free text searching" capability of the DIALOG retrieval system in which all fields containing subject terms are scanned: title, abstract, identifier, and descriptor. In addition, word proximity and truncation features are incorporated into the strategy in order to retrieve word variants.

Formulation #2

```
1 SS PARAPSYCH? OR PSYCHIC?

4 SS ESP OR EXTRA(W)SENSORY OR EXTRASENSORY OR S3
```

Formulations #1 and #2 are examples of the building block approach to search strategy. This approach is especially suitable for this topic: since all information on this topic is desired, the searcher need not be concerned with restricting the size or with developing a high precision formulation. Consequently, the searcher is more involved with expressing all aspects of the concept, word variants and synonyms, rather than monitoring intermediary results of the search. The Briefsearch would appear unnecessary here since the topic is limited to a single facet and can be easily searched using a few simple search statements.

(Reader: Keeping in mind the stated information need of the requestor, i.e., to retrieve all relevant items in the ERIC ONTAP file, which formulation would you choose? _________________)

Before evaluating the results of the two formulations, you may wish to draw up your own strategy and search the ONTAP file. Formulation #2 serves as an example for demonstrating the searching procedures of the ONTAP file. Whether you construct your own formulation or use one of the above examples, follow the explanation below as you use the ONTAP file.

After signing on to DIALOG, enter the BEGIN 201 command to start searching the file. Let's review the explanation of the ONTAP file. Type ?ONTAP201 or ?FILE201 to view this text:

```
? ?ONTAP201
ONTAP FILE FOR THE ERIC DATABASE.  THE
FILE PROVIDES TEST QUESTIONS & RELEVANT
CITATIONS FOR EACH QUESTION.  THE 1975
ERIC FILE IS THE SOURCE OF THE ANSWER
SETS.  QUESTIONS AND ANSWER SETS ARE
LABELLED AS TO COMPLEXITY,E.G. AN=S03,
AN=M04,AN=D03 DENOTE THE ANSWER SETS
FOR THE 3RD SIMPLE, 4TH MEDIUM, AND 3RD
DIFFICULT QUESTION.  AFTER FINISHING
SEARCH, THE PERFECT ANSWER SET FOR THAT
QUESTION CAN BE SELECTED BY COMMANDS OF
THE FORM 'SELECT AN=S03', AND SELECTED
ANSWER SETS CAN BE COMBINED IN AN AND
RELATIONSHIP WITH YOUR FINAL SEARCH SET
TO FIND OUT HOW MANY RELEVANT CITATIONS
YOU FOUND. A COMMAND /EVAL COMPUTES THE
RECALL AND PRECISION OF YOUR SEARCH.
SEE    ?TAPSAM FOR SAMPLE SIMPLE SEARCH
       ?TAPSIM FOR LIST OF SIMPLE QUESTS.
       ?TAPMED FOR LIST OF MEDIUM QUESTS.
       ?TAPDIF FOR LIST OF DIFFICULT
        QUESTIONS
       ?EVAL FOR EXPLANATION OF PREC/REL.
OFFLINE PRINTS CANNOT BE REQUESTED IN
FILE 201 AND THE SEARCH.SAVE FEATURE IS
NOT APPLICABLE IN FILE201.  COST PER
CONNECT HOUR IS $15.
```

At the conclusion of the above explanations are listed a number of commands: (1) ?TAPSAM provides step-by-step directions for searching the ONTAP file; (2) ?TAPSIM, ?TAPMED, ?TAPMED2, ?TAPDIF, ?TAPDIF2 are lists of ONTAP search questions and their corresponding answer sets; (3) ?EVAL gives the procedures for computing recall and precision scores. Using formulation #2 as an example of searching ERIC ONTAP, we are ready to perform the search. Let's review all the steps of the searching procedures by reading the directions triggered by the ?TAPSAM command.

```
     ?TAPSAM
TO USE THE ONTAP FILE, THE USER MUST
BEGIN201:
     1)SELECT QUESTION FROM PRINTED LIST OR
       BY ?TAPSIM, ?TAPMED, ?TAPDIF,
     2)COMPLETE SEARCH IN YOUR OWN WAY
     3)SELECT AN=(YOUR CHOSEN QUESTION#)
       FOR ANSWER SET
     4)AND YOUR FINAL SEARCH SET AND ANSWER
       SET
     5)ENTER EVAL COMMAND USING /EVAL(A,B,
       C), WHERE A=#CITATIONS IN SEARCH SET
       B=#CITATIONS IN ANSWER SET
       C=#CITATIONS IN COMBINED SET
E.G.:1)CHOOSE QUESTION AN=S01
     2)S DRAW(2W)PERSON(W)TEST (SET1)
     3)SELECT AN=S01 (SET 2)
     4)COMBINE 1 AND 2
     5)ENTER /EVAL COMMAND,E.G. /EVAL
       (4,5,4)
TO IMPROVE YOUR RESULTS, TRY LOOKING AT
OTHER RECORDS FOR SEARCHING IDEAS.
```

The first step in the directions recommends that we select a search topic from the lists of simple, medium, and difficult questions. Since we have already chosen Parapsychology as a topic, let's move on to the second step, "complete search in your own way." Formulation #2 is repeated below, but you can perform the search using your own strategy.

Formulation #2

```
SS PARAPSYCH? OR PSYCHIC?
   1   5  PARASYCH?
   2   9  PSYCHIC?
   3  12  1 OR 2
SS ESP OR EXTRA(W)SENSORY
   OR EXTRASENSORY OR S3
   4   7  ESP
   5   1  EXTRA(W)SENSORY
   6   1  EXTRASENSORY
   7  18  3 OR 4 OR 5 OR 6
```

Comments

Using DIALOG's SuperSELECT STEPS feature, we can create separate sets for every search term just in case we need to refer to these sets at a later point in the search.

At this point, it is necessary to find out whether Parapsychology is a simple, medium, or difficult topic so that we can compare our answer set with ONTAP's "perfect answer set." Since there are a number of search question lists, let's print the list of simple questions first using the ?TAPSIM command.

```
? ?TAPSIM
     SIMPLE SEARCH TOPICS:
     S01   DRAW-A-PERSON TEST
     S02   FID(INT. FED. FOR DOC.)& LIBRARY
     OR INFORMATION NETWORKING
     S03   4-H CLUBS, THEIR MEMBERS &ACTIVITIES
     S04   REVISION,ANGLO-AMERICAN CATAL.RULES
     S05   NAVAHO LANGUAGE TEXTBOOKS/GRAMMARS
     (MATERIAL IN NAVAHO,OR USEFUL FOR
     TEACHING NAVAHO,OR ABOUT NAVAHO LINGUIS-
     TICS)
     S06   EDUCATION,SRI LANKA(INCL.LIBRARY
     ACTIVITIES)
     S07   LITERACY IN DEVELOPING COUNTRIES
     PUBLISHED BY THE INT'L. INSTITUTE FOR
     ADULT LITERACY METHODS (OR ANY PUBLICA
     TIONS BY OR ABOUT THIS INSTITUTE)
     S08   16 PERSONALITY FACTOR TEST
     S09   PARAPSYCHOLOGY
```

Reviewing the list above, we find that Parapsychology is simple search question number 9. By selecting the accession number assigned to the topic, we can obtain the number of postings in the "perfect answer set." The following example demonstrates how to select the answer set.

<u>Formulation #2</u> (cont.)	<u>Comments</u>
SELECT AN=S09 (or S AN=S09)	Selecting answer set to simple question #9.
8 9 AN=S09 (Parapsychology)	System response.

The next step is to combine our final answer set (search statement #7) with the ONTAP answer set (search statement #8). In this way, we can find out how many of the items we retrieved are included in the ONTAP answer set. The result of this operation is shown below, and indicates that we have retrieved <u>all</u> the items in the ONTAP answer set in addition to some non-relevant material.

<u>Formulation #2</u> (cont.)	<u>Comments</u>
C 7 AND 8	Statements 7 and 8 are combined, excluding non-relevant material in our retrieved set.
9 9 7 AND 8	System response.

Although we can figure recall and precision scores by comparing the relevant items listed by ERIC accession number at the conclusion of this discussion with the final set (statement #7) of our search, ERIC ONTAP provides the /EVAL capability for computing the scores. The directions are obtained by typing ?EVAL.

```
? ?EVAL
/EVAL (A,B,C) COMPUTES THE RECALL AND
PRECISION OF A SEARCH.  THE PARAMETERS
ARE:
    A=TOTAL NUMBER OF CITATIONS FOUND
      IN YOUR FINAL ANSWER SET
    B=NUMBER OF CITATIONS IN ONTAP
      ANSWER SET
    C=NO. OF CITATIONS IN ANSWER SET
        FOUND BY USER (RESULT OF
        LOGICAL AND OF A AND B)
    RECALL=C/B   Precision=C/A
RECALL TELLS YOU % OF RELEVANT CITA-
TIONS IN THE FILE THAT YOU FOUND.
PRECISION GIVES % OF YOUR CITATIONS
THAT WERE RELEVANT.
```

After following the directions above, we can determine from reviewing the online interaction that A=18 (total number of citations found in my final answer set, statement #7), B=9 (number of citations in ONTAP answer set, statement #8), and C=9 (number of citations in answer set found by COMBINing statements #7 and #8 in statement 9). These values are inserted into the /EVAL formula in order to obtain recall and precision percentages.

<u>Formulation #2</u> (cont.)	<u>Comments</u>
/EVAL(18,9,9)	EVAL command with values A, B & C inserted.
INPUT. . .EVAL(18,9,9)	System response to /EVAL formula.

```
   Number of citations found=18
   Number of citations in answer set=9
   Number of relevant citations found=9
   RECALL=100%   PRECISION=50%
```

As mentioned previously, you can figure recall and precision ratios for your performance by checking the results of your search with the list of ERIC accession numbers which form the answer set to the Parapsychology search topic. Before moving on to the next search question, let's compare the results of the two formulations for Parapsychology.

Step 8: <u>Evaluating Final Results</u>

As shown above, the second formulation which uses free text searching of the ONTAP database retrieves <u>all</u> the relevant citations. The results of the search are summarized below:

Formulation #2

Number of citations found=18

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{9}{9}$$ (100% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{9}{18}$$ (50% of retrieved documents are relevant)

Of the eighteen citations retrieved by formulation #2, nine are non-relevant; seven of these are retrieved by the search term Psychic used as a homograph in the title or abstract. "Psychic energy," "psychic distance," and "psychic development" serve as examples of phrases in which the term Psychic occurs but is deemed non-relevant to the search topic. In the remaining two non-relevant items, ESP is used as an acronym for a program.

In contrast, formulation #1 retrieves eight citations. Comparing its answer set with the list of ERIC accession numbers at the conclusion of this discussion, we can obtain recall and precision.

Formulation #1

Number of citations found=8

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{7}{9}$$ (78% relevant documents retrieved)

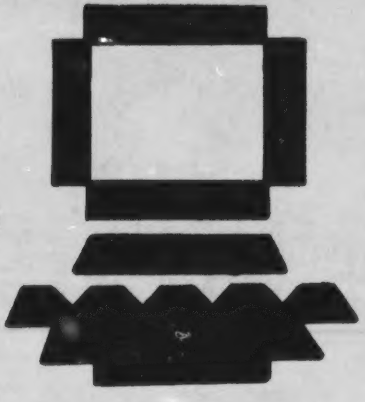
$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{7}{8}$$ (88% of retrieved documents are relevant)

This formulation relies on the controlled vocabulary and title fields for search terms; in this case, precision, the number of relevant items in the output improved when compared with the precision of the second formulation. The one non-relevant item is retrieved because the search term PSYCHIC, which occurs in the title field, does not describe the content of the document, but is used to capture the reader's interest. Both of the two relevant items which are not retrieved contain variants of EXTRASENSORY in the abstract. The formulation fails to capture these two relevant documents because the abstract field, a source of subject-rich terminology, is not searched.

Since the requestor is interested in retrieving all relevant information, formulation #2 is preferred in this instance.

Relevant citations (cited by ERIC accession number):

EJ115774 EJ113605 EJ113604 EJ110046 EJ105855 ED110382
ED107626 ED104113 ED099252



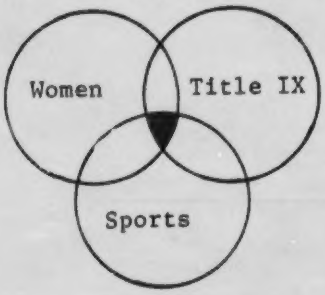
TITLE IX AND WOMEN'S SPORTS

Search Topic #1: Title IX, 1972 Federal Education Act Amendments and Women's Sports. (S AN=M10)

Search Objective: The expressed information need is to achieve a high recall search with a low number of non-relevant citations.

Step 3: Formulating Basic Search Logic--Planning Search Strategies

Three facets comprise the topic: SPORTS, WOMEN, and TITLE IX. The diagram below illustrates the three facets of the search. Where the three circles intersect is the retrieved portion of the database.



Subsearches for the three facets of the search assume the same strategy as the sample search topic Parapsychology. Just as all terms representing the concept of parapsychology are searched and the results combined in an OR relationship, subsearches for each facet of this topic will be performed in the same way. All terms representing WOMEN, free text and/or assigned index terms, are SELECTed and the results COMBINEd by an OR operator; likewise, SPORTS and its variant forms and synonymous terminology are joined by OR; a set representing TITLE IX is formed similarly. The three subsearches are then COMBINEd by the AND operator, thus creating the final set.

Step 4: Compiling the Search Terms

Women is a "lead-in" term in the ERIC Thesaurus directing the searcher to Females. From the list for Females, descriptors indicating WOMEN are gathered. The term SPORTS, like WOMEN, is not a descriptor but leads to Athletics. There are no descriptors to represent TITLE IX or 1972 Federal Education Act Amendments; consequently, determining variant forms of the Act for searching the assigned index fields of the ERIC record can be done by reviewing the online dictionary for different forms which may occur in the identifier field, SELECTing from the list, and/or using these forms to compose word proximity phrases for free text searching.

Step 5: Ordering Output

Since the information seeker desires a high recall with a minimum of non-relevant citations in the output, the searcher must decide what approach to search strategy would eliminate the majority of non-relevant citations from the output. Selecting the most specific facet first approach may be a wise choice as the size of the set representing the most specific facet, TITLE IX, may be small enough to terminate the search before applying any other facets to the strategy. At the same time, the output can be monitored for loss of relevant material as search facets are applied to the strategy. The Briefsearch could also be used initially in order to estimate the size of the final set. The formulations below include both approaches as well as the building block approach.

Step 6: Conceptualizing the Search as Input to the Retrieval System

The Briefsearch, formulation #1, can be used to make a quick survey of the ERIC file before a more complicated formulation is entered; rapid and efficient in terms of online connect time, the Briefsearch can be formulated in a number of ways. In this formulation, SuperSELECT is used to enter all three facets, WOMEN, TITLE IX, and SPORTS, in a single command. The SuperSELECT STEPS creates intermediary sets as well as the outcome of the entire search statement. In this way, the searcher does not have to re-enter any part of the search statement if he decides to use intermediary results of the formulation at a later time.

Briefsearch

```
1 SS (WOM?N? OR FEMALE?)
     AND ATHLETIC? AND
     (TITLE(W)IX OR TITLE(W)9)
```

The Briefsearch formulation retrieves six citations. At this point, the searcher may call up the citations for online printing in order to check the searching vocabulary used in the strategy with that of the free text and assigned index fields of the document, or the searcher may continue searching with a more complex formulation.

In formulation #2, all subject-conveying fields are searched using free text and word proximity. It is considerably more complex and comprehensive than the Briefsearch. Since WOMEN, one of the facets of the topic, is a concept which occurs frequently as a population group in ERIC searches, a subsearch is formulated with high recall as the goal; the search is saved for future use in ERIC searches. By entering the .EXECUTE or .EXECUTE STEPS command, the Search Save for WOMEN is performed and its results can be assimilated into the present search on "Title IX and women's sports." The formulation of the Search Save is given below. The appendix contains 10 Search Save formulations, which are referred to in Section II search topics. Since SuperSELECT formulations can contain up to 240 characters, all the search terms in the following Search Save can be entered in a single command.

Search facet: WOMEN	**Comments**
1 S DAUGHTER?	All subject-conveying fields are searched in the Search Save for WOMEN. High recall is the primary goal of the subsearch.
2 S FEMALE?	Included DESCRIPTORS and identifiers are FEMALES, FEMINISM, GIRLS CLUBS, HOUSEWIVES, MOTHER ATTITUDES, MOTHERS, NUN TEACHERS, NUNS, WOMEN PROFESSORS, WOMEN TEACHERS, WORKING WOMEN, WOMENS ATHLETICS, WOMENS EDUCATION, WOMENS STUDIES /Female, Feminist Press, Feminization, Masculinity Femininity Variable, Girl Guides Association, Girl Scouts, Girl Scouts of America, Camp Fire Girls.
3 S FEMINI?	
4 S GIRL?	
5 S GRANDMOTHER?	
6 S HOUSEWI?E?	
7 S LADY?	
8 S LADIES?	
9 S MOTHER?	
10 S NUN	
11 S NUNS	Included DESCRIPTORS and identifiers are 3 multi-term MOTHERS Descriptors, 7 multi-term Mother identifiers, Sisters, Wife, Wives, Women, 11 multi-term Women and Women's identifiers.
12 S SISTER	
13 S SISTERS	
14 S WIFE	
15 S WIVES	
16 S WOM?N?	
17 C 1-16/OR	

```
   END/SAVE
SERIAL#1KLM
        20MAY81 8:52:56 USER 4111
$0.00  0.046 HRS FILE201  00 DESCRIPTORS
$0.37  TYMNET
$0.37  ESTIMATED TOTAL COST
```

Saved by the END/SAVE command, the formulation is assigned serial number 1KLM. The Search Save can be recalled and executed by the command .EXECUTE 1KLM.

Procedures for exchanging Search Saves between DIALOG accounts are given in the introduction to the appendix.

Free text searching is used in formulation #2. The building block approach characterizes this strategy as all three facets are developed in the formulation and combined in the final step.

Formulation #2: Free text searching

1.	.EXECUTE 1KLM	Search Save for WOMEN is processed.
2	S ATHLET?	Included DESCRIPTORS/Identifiers: ATHLETES, ATHLETIC COACHES, ATHLETIC EQUIPMENT, ATHLETIC FIELDS, ATHLETIC PROGRAMS, INTRAMURAL ATHLETIC PROGRAMS, ATHLETICS, WOMENS ATHLETICS /Athletic Administrators, Athletic Associations, Athletics for Handicapped, Athletic Trainers.
3	S GYM?	GYMNASIUMS/ Gymnastics, Gymnastics Judges.
4	S PHYSICAL(W)EDUCATION	PHYSICAL EDUCATION, ADAPTED PHYSICAL EDUCATION, PHYSICAL EDUCATION FACILITIES/ Physical Education and Recreation, Physical Education Majors, Physical Education Teachers.
5	S SPORT?	SPORTSMANSHIP /Sport Ambassadors, Sport for All, Sporting Goods, Sports, 6 multi-term Sports Identifiers.
6	C 2-5/OR	
7	SS EDUCATION(W)AMENDMENT? ?(F)1972 OR TITLE(W)IX OR TITLE(W)9	
10	C 1 AND 6 AND 9	All three facets are joined together in this final statement.

Working with the most specific facet first approach allows the searcher to terminate the search when the final set shrinks to a size satisfactory to the search objective. This is the approach used in formulation #3. TITLE IX is selected as the most specific facet since it is a named object rather than a concept like WOMEN or SPORTS. In order to determine the different ways the phrase can be represented, the searcher uses the EXPAND capability, SELECTs from the display, and formulates word proximity phrases for free text searching. The EXPAND display for the phrase TITLE IX/ID follows:

```
? ETITLE IX/ID
Ref Items  Index-term                RT
E1   1135  TITLE
E2      1  TITLE III
E3        *TITLE IX
E4     16  TITLE IX EDUCATION
             AMENDMENTS 1972
E5      2  TITLE VII
E6         TITLE WORD INDEXES         1
E7    298  TITLES
E8      2  TITRIMETRY
E9      3  TLINGIT
E10     1  TLINGIT (TRIBE)
E11     9  TN
                                 -more-
```

From the above display, the searcher selects the desired item (E4), then proceeds to another EXPAND display for the Education Amendments Act of 1972.

```
? EEDUCATION AMENDMENTS OF 1972/ID
Ref Items  Index-term                RT
E1         EDUCABLE MENTALLY HANDIC
             APPED (1966 1980)        1
E2  21748  EDUCATION  (PROCESS OF
             IMPARTING OR OBTAIN    133
E3        *EDUCATION AMENDMENTS OF
             1972
E4      5  EDUCATION AMENDMENTS
             1972
E5      4  EDUCATION AMENDMENTS
             1974
E6      1  EDUCATION AND ECSTASY
E7         EDUCATION AND WORK         1
                                 -more-
```

After viewing the EXPAND display of the identifier field, the searcher selects the reference number (E3) from the display to incorporate into the search formulation.

Formulation #3	Comments
EXPAND TITLE IX/ID	
1 S E4	
EXPAND EDUCATION AMENDMENTS 1972	

Formulation #3 (cont.)	Comments
2 SS E4 AND S1	At this point, 17 citations are retrieved. Rather than end the search, one of the other facets is applied to the formulation.
3 SS SPORT?/DE,ID OR ATHLETIC?/DE,ID	
6 C 5AND 3	The combination of the two facets, Title IX and SPORTS results in 6 citations. The search could be ended or the third facet applied.

In the above formulation, the application of the second facet to the first reduces the postings from 17 to 6. The searcher could develop the third facet, but, in this case, has terminated the search rather than continue the online interaction; however, this choice may affect the precision score as all facets representing the topic have not been exhausted in the strategy.

(Reader: In the light of the search objective, to retrieve high recall with a low number of non-relevant citations, which strategy would you choose? __________)

Step 8: Evaluating Final Results

Before figuring recall and precision scores, we must find out what accession number has been assigned to the search in the ONTAP file. Reviewing the list of all simple topics in the discussion of the Parapsychology query discloses that this topic, "Title IX and women's sports," is not among the simple topics. The list of medium topics may be obtained by the command ?TAPMED.

```
? ?TAPMED
MEDIUM SEARCH TOPICS:
M01  DIRECT CHARGING TO USERS FOR REF-
ERENCE & CURRENT AWARENESS SERVICE OF
     LIBRARIES OR OTHER INFO SERVICES (
     PHILOSOPHY,POLICY,PRACTICE, FEE
     CHARGES;ANY TYPE OF LIBRARY;ANY
     TYPE OF REFERENCE SERVICE;NOT IN-
     TERESTED IN FREE SERVICES)
M02  FEDERAL AID TO DAY CARE CENTERS OR
     SERVICES (INCLUDING HISTORY,PHILOS-
     OPHY,ARGUMENTS PRO & CON,EXPERI-
     ENCES,FUNDING, EVALUATION,PARENT
     INVOLVEMENT AND ATTITUDES)ONLY
     U.S.  CENTERS OR SERVICES
```

```
M03  JEAN PIAGET'S THEORIES, AND THOUGHT
     PROCESSES OR LANGUAGE DEVELOPMENT
     OF CHILDREN, BUT LIMITED TO PUBLI-
     CATION AVAILABLE FROM ERIC/EDRS
FOR MORE, ENTER ?TAPMED1
? ?TAPMED1
     MEDIUM SEARCH TOPICS:
M04  LIBRARIES & LIBRARIANS IN MIDDLE
     EAST,(EXCLUDE AFRICAN BUT NOT
     EGYPT).  INCLUDE ALL TYPES OF LIB-
     RARIES & INFORMATION CENTERS
M05  LIBRARY SERVICE TO PHYSICALLY
     HANDICAPPED (NOT MENTALLY OR
     LANGUAGE-HANDICAPPED)
M06  EFFECTS OF TV VIOLENCE ON CHILDREN
M07  DRUG ABUSE,INCLUDING ALCOHOL,AMONG
     STUDENTS OF ELEMENTARY OR SECONDARY
     SCHOOLS,GRADES K-12(INCLUDING
     SCHOOL EDUCATION PROGRAMS AND
     SOCIOLOGICAL STUDIES)
M08  SCHOOL BUSING & RACIAL INTEGRATION
M09  RECREATIONAL USE OF FOREST LANDS
M10  TITLE 9, 1972 FEDERAL EDUCATION ACT
     AMENDMENTS,AND WOMEN'S SPORTS
M11  WHITE FLIGHT TO THE SUBURBS
```

Scanning the above list, one finds that the search question has been assigned accession number M10. To determine how many citations are relevant to the search topic, select the accession number, e.g., SELECT AN=M10. Using the EVAL procedure discussed in the sample search, the results of the three formulations are evaluated. The Briefsearch, formulation #1, fared very well, retrieving all six relevant citations.

Briefsearch and Formulation #2

Number of citations found=6

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{6}{6}$ (100% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{6}{6}$ (100% of retrieved documents are relevant)

Formulation #3 in which the most specific facet first approach is demonstrated retrieves most of the relevant items but also some non-relevant items.

Formulation #3

Number of citations found=6

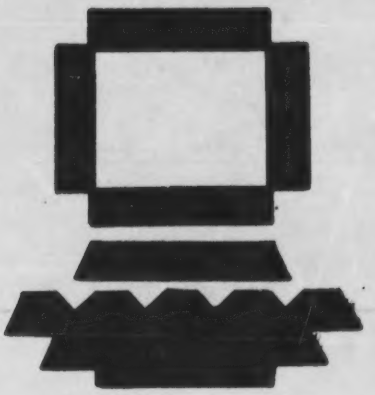
$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{4}{6} \quad \text{(66\% relevant documents retrieved)}$$

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{4}{6} \quad \text{(66\% of retrieved documents are relevant)}$$

The Briefsearch and Formulation #2 retrieve all the relevant items with no non-relevant items, resulting in 100% recall and 100% precision. However, the Briefsearch is the preferred approach as it requires a minimum of typing and response time. Formulation #2 performed identically in terms of recall and precision, but necessitated many more search terms and statements. The two relevant items which formulation #3 fails to retrieve contain references to Title IX in the abstract. Since only controlled vocabulary fields are searched in formulation #3, these two relevant items are not contained in the final set.

Relevant citations:

EJ119209 EJ105832 EJ105671 EJ104420 EJ104192 ED110452



4-H CLUBS

Search topic #2: 4-H Clubs, their members and activities. (S AN=S03)

Step 3: Formulating Basic Search Logic--Planning Search Strategies

A single concept is present in the topic: 4-H CLUBS, MEMBERS, and ACTIVITIES. Before incorporating the MEMBERS and ACTIVITIES facets into the formulation, the strategy begins with the most specific facet first, i.e., 4-H CLUBS. Consideration must be given when constructing the formulation to include variant forms and spellings of the CLUB.

Step 4: Compiling the Search Terms

No descriptors are listed in the ERIC Thesaurus which directly refer to 4-H Clubs. Search formulations are constructed using the word proximity feature in order to retrieve different spellings of the Club.

Step 5: Ordering Output

No output specifications are requested.

Step 6: Conceptualizing the Search as Input to the Retrieval System

If a high precision search is required, you could search only the identifier field as in the following formulation:

Formulation #1	Comments
1 SS 4(W)H/ID OR FOUR(W)H/ID	Only the identifier field is searched.

The following search formulation is a high recall formulation in which all subject-conveying fields are searched:

Formulation #2	Comments
1 S4(W)H OR FOUR(W)H	To access all subject-conveying fields, the ID qualifier is dropped.

Step 7: Evaluating Preliminary Results

In formulation #1 fourteen citations are retrieved, 21 in the second formulation. At this point the number of citations is sufficiently small in both cases that it is felt to be unnecessary to impose the MEMBER or ACTIVITIES aspect of the search. This is an example of starting with the most specific facet first. •

Step 8: Evaluating Final Results

Searching the identifier field in the first formulation results in high precision but some relevant items are missed resulting in a lower recall score than formulation #2, in which all subject rich fields are searched. The recall and precision scores for both formulations are summarized below:

Formulation #1

Number of citations found=14

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{14}{17}$$

(82% relevant documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{13}{14}$$

of retrieved documents are relevant)

Formulation #2

Number of citations found=21

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{17}{17}$$

(100% relevant documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{17}{21}$$

(85% of retrieved documents are relevant)

Relevant citations:

EJ120500 EJ117540 EJ113715 EJ109322 EJ107077 EJ107045 ED109352
ED109351 ED109205 ED105103 ED105102 ED105101 ED105100 ED104895
ED102469 ED100323 ED095289

16 FACTOR PERSONALITY TEST

Search Topic #3: 16 Personality Factor Test

Search Objective: The stated information need is to retrieve a maximum number of relevant citations. (S AN=S08)

Step 3: Formulating Basic Search Logic--Planning Search Strategies

A single facet is present in the search topic: 16 PERSONALITY FACTOR TEST. The main difficulty with this search is the different spellings of this test.

Step 4: Compiling the Search Terms

Since no descriptors are listed in the ERIC Thesaurus, you could EXPAND the numeric character 16 as an identifier and SELECT from the online dictionary; then EXPAND Sixteen and SELECT from that portion of the online dictionary for identifiers.

Step 5: Ordering Output

Keeping in mind the search objective, the searcher should strive to reduce online connect time by preparing before the online interaction, curtailing excessive typing in order to minimize typing errors, and selecting a suitable approach to search strategy. The Briefsearch may be favored because of its efficiency; variant spellings of the test could be represented by single search statements using word proximity.

Step 6: Conceptualizing the Search as Input to the Retrieval System

Formulation #1 takes advantage of the online dictionary to find the preferred spelling of the test in the identifier field. The searcher uses the EXPAND command to view three online dictionary displays; the third display finally leads the searcher to the preferred spelling, which is selected from the display and constitutes the final answer set of formulation #1.

Formulation #1

```
 E16PF/ID
Ref Items  Index-term
E1    578  15
E2    391  16
E3         *16PF
E4    334  18
E5      5  1862
E6      5  1887
E7      9  1890
```

Comments

The searcher views the online thesaurus display for "16PF" and finds no search terms.

Formulation #1 (cont.)

Comments

```
? E16(W)PERSONALITY/ID
Ref Items  Index-term
E1    578  15
E2    391  16
E3        *16(W)PERSONALITY
E4    334  18

E5      5  1862
```

The second EXPAND display of "16(W) PERSONALITY" leads to no search terms.

```
? ESIXTEEN(W)PERSONALITY/ID
Ref Items  Index-term                    RT
E1         SIXTEEN MILLIMETER PROJE
             CTORS (1966 1980)            1
E2     10  SIXTEEN PERSONALITY
             FACTOR QUESTIONNAIRE
E3        *SIXTEEN(W)PERSONALITY
E4    272  SIXTH
E5      1  SIXTH YEAR PROGRAMS
E6    457  SIZE
E7      2  SIZEMORE
E8      2  SIZEMORE (BARBARA A)
E9      5  SKAGIT
E10     4  SKAGIT VALLEY COLLEGE WA
                                    -more-
```

The third EXPAND display produces the preferred spelling, (E3), which is SELECTed from the on-online dictionary display.

```
? SE5
     1  10 SIXTEEN PERSONALITY FACTOR QUESTIONNAIRE
```

In formulation #2, the searcher uses SuperSELECT to input all possible spellings in a single command. All subject-rich fields are searched, i.e., identifier, descriptor, title, and abstract.

Formulation #2

```
1  S 16PF OR 16(W)PERSONALITY OR
     SIXTEEN(W)PERSONALITY OR 16(W)P(W)F
```

(Reader: Keeping in mind that the information seeker is concerned with online connect time, which formulation would you choose? ___________)

Step 8: Evaluating Final Results

In order to find out what citations are relevant to the topic, the searcher must review the lists of simple, medium, and difficult topics to find out the accession number of the search. From the list of simple topics, we find that the topic is assigned number simple 8 (S08), which we then SELECT (S AN=S08) in order to obtain the number of relevant items. Recall and precision scores for both formulations are summarized below:

Formulation #1

Number of citations found=10

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{9}{12}$$

(75% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{9}{10}$$

(90% of retrieved documents are relevant)

Formulation #2

Number of citations found=13

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{12}{12}$$

(100% relevant documents retrieved)

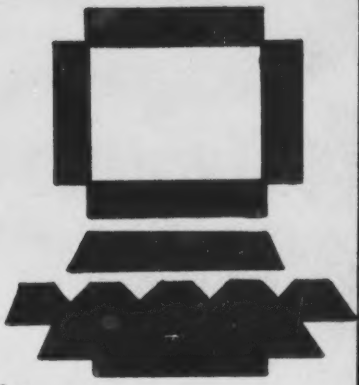
$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{12}{13}$$

(92% of retrieved documents are relevant)

Since the online dictionary is called up in formulation #1, it is time-consuming, thus costly. In a trial run of the first formulation in which three EXPAND commands are used, the search takes .125 (7½ minutes) to perform. In comparison, the Briefsearch takes .25 (1½ minutes), and, in this case, retrieves the same set of documents. Because of its efficiency the Briefsearch is preferred for search topic #3.

Relevant citations:

EJ120592	EJ117340	EJ117192	EJ115601	EJ115600	EJ112211
EJ108963	ED103575	ED103574	ED102449	ED101228	ED095465



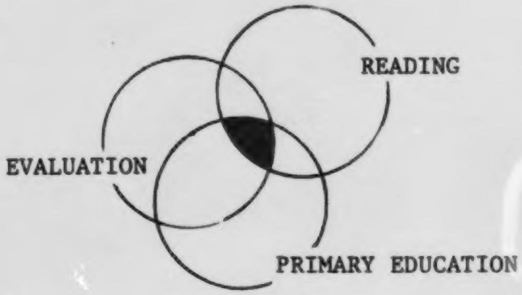
PRIMARY SCHOOL READING PROGRAMS

Search Topic #4: Evaluation of Primary School (grades K-3) English reading programs or reading materials and techniques (not evaluation of specific reading tests or instructors, not student test scores when not part of evaluation of reading program, and not just criteria or standards for evaluation).(S AN=D03)

Search Objective: To retrieve as much relevant material as possible with a minimum of non-relevant citations in the output. Only publications available from EDRS are desired.

Step 3: Formulating Basic Search Logic--Planning Search Strategies

The search topic can be broken down into three facets: reading, primary school, and evaluation. Illustrated in the following diagram, the search topic is separated into its three facets which intersect to form the portion of the database intended for retrieval.



Representing those aspects of the query which are not wanted, e.g., evaluation of reading tests, evaluation of instructors, may eliminate relevant material from the output. For example, a set created by the statement "EVALUATION AND READING" may have documents dealing with the evaluation of reading teachers as well as how teachers evaluate reading materials, so that a set created by the statement "READING AND (EVALUATION NOT TEACHERS)" would exclude valuable material. Consequently, the search formulations constructed below will not employ the Boolean NOT operator.

Step 4: Compiling the Search Terms

All facets of the search are well represented by terms from the ERIC Thesaurus. In fact, entering READING as a free text search term retrieves occurrences of the term in 48 multi-term READING descriptors, numerous multi-term READING identifiers and all occurrences of the term READING in free text fields, i.e., title and abstract. EVALUATION occurs in 29 multi-term descriptors, and in numerous multi-term identifiers as well as in free text fields. The abundance of subject terminology acts detrimentally as the search is made difficult by the volume of literature in the ERIC file on reading and on evaluation.

Step 5: Ordering Output

In order to restrict the search to documents available from EDRS, the LIMIT command can be applied at the beginning of the search. Applying the LIMIT after the creation of the first facet allows the searcher to monitor preliminary search results throughout the online interaction.

The ERIC file contains much material on reading and evaluation, so the searcher should select an approach to search strategy that enables constant evaluation of preliminary search results. In this way, the searcher can introduce limiting criteria to the formulation as the search is in progress. For example, in the building block approach, the combination of all three facets occurs as the final statement of the search; if the resultant set is too large, the searcher has little recourse except to "backtrack" or reformulate some of the essential elements of the search.

On the other hand, in the successive fractions approach, the search is limited to the initial "bite" or partition of the file; subsequent search facets continue to be applied to this partition so that the searcher can terminate the search if necessary before exhausting all search facets.

The sample formulations provided in step 6 cover the successive fractions and building block approaches. Follow the development of the formulations by reading the COMMENTS section, so that you are aware of the decisions made by the searcher as the search proceeds.

Step 6: Conceptualizing the Search as Input to the Retrieval System

Because the volume of literature on Reading is so large, you could formulate a Briefsearch first in order to perform a survey of the file. This will give you an idea of the possible size of the final set.

Briefsearch	Comments
1 SS (PRIMARY(W)EDUCATION OR EARLY(W)CHILDHOOD) AND READING AND EVALUATION	62 citations are retrieved in the Briefsearch, giving an estimation of the volume of output.

6 LIMIT 5/AVAIL

Since the terms READING and EVALUATION have such high posting counts, the formulation might concentrate on the identifier, descriptor, and title fields in order to eliminate the possibility of retrieving false drops due to casual mention of the search terms Reading and Evaluation in the abstract field. Using Search Save #1 (see appendix) for representing the facet of PRIMARY EDUCATION, the following strategy, an example of the building block approach, searches the assigned index fields and title for the READING and EVALUATION facets and all free text fields for the PRIMARY EDUCATION facet.

Formulation #2	Comments
1 .EXECUTE_____(Search Save serial number for Primary Education)	
2 LIMIT 1/AVAIL	The LIMIT is applied to the set of the facet PRIMARY EDUCATION as the second step in this formulation.
3 S READING/DE,ID,TI	Reading, as a search term, is restricted to occurrences in the title and assigned term fields.
4 SS COMPARATIVE(W)ANALYSIS/DE, ID,TI OR COMPARATIVE(W)TESTING/ DE,ID,TI OR EVALUATION/DE,ID,TI	Statements 4-7 form the facet EVALUATION; searching is limited to the title and assigned term fields.
8 C 2 AND 3 AND 7	

The high recall search formulation employs Search Save #1 for the PRIMARY EDUCATION facet and Search Save #7 for the EVALUATION facet (see appendix). Formulation #3 is an example of the successive fractions approach to search strategy; as this search progresses, note what factors are applied to the formulation in order to restrict volume of output.

Formulation #3	Comments
Part I:	
1 .EXECUTE_____(Search Save for Primary Education)	
2 LIMIT 1/AVAIL	
3 SS READER? OR READING	
6 C 2 AND 5	Two facets of the search, READING and PRIMARY EDUCATION are joined by AND; the large number of citations retrieved at this point (363) makes it clear that further reductions are necessary. The next step is to apply the general Search Save for EVALUATION to the search.
7 .EXECUTE_____(Search Save for general EVALUATION)	

Formulation #3 (cont.)	Comments
Part I (cont.):	
8 C 6 AND 7	The COMBINing of the three facets results in 253 citations. All subject-rich fields have been searched up to this point, and the search could be concluded if the search objective were high recall.
Part II:	
9 .EXECUTE_____ (Search Save for restricted EVALUATION)	Since the output of the high recall formulation is large, the formulation is reconstructed using Search Save #8 for EVALUATION. Search terms are limited to descriptors whose occurrences are retrieved from the assigned index and title fields.
10 C 9 AND 6	Here, the volume of output is reduced to a total of 160 citations.
11 S READING/DE,ID,TI AND S2 AND S7	Another approach to restricting the formulation is to limit the READING facet to occurrences of Reading in title, identifier and descriptor fields and combine it with the Search Saves for PRIMARY EDU-CATION and general EVALUATION. At this point, 200 citations are retrieved, and it is decided to continue introducing limiting criteria to the search formulation.
Part III:	
12 SS ACHIEVE?/DE,ID,TI OR APPRAIS?/DE,ID,TI OR ASSESS?/DE,ID,TI OR COMPAR?/DE,ID,TI OR EVALUAT?/DE,ID,TI	Instead of using the comprehensive EVALUATION Search Saves, a formulation containing a few search terms from the EVALUATION Search Saves is constructed. Retrieval is restricted to the identifier, descriptor and title fields. Statements 12-17 make up a subsearch for EVALUATION.

Formulation #3 **Comments**
Part III (cont.):

18 C 2 AND 11 AND 17 58 citations are retrieved using the abbreviated subsearch for EVALUATION, Search Save for PRIMARY EDUCATION, and the restricted READING set.

(Reader: Given the many possible approaches to formulating the search strategy, which formulation would you choose? Keep in mind that the information seeker desires a minimum of non-relevant citations in the output._______)

Step 8: Evaluating Final Results

The list of difficult questions in the ONTAP file is given below and must be checked for ONTAP accession numbers. In this way, one can SELECT the accession number (S AN=D03) in order to find out how many citations are relevant to this topic.

```
? ?TAPDIF
D01  TRAINING FOR SUPERVISION & MANAGE-
     MENT IN LIBRARIES & INFORMATION
     CENTERS (INCL.  NEED FOR TRAINING, DES
     CRIPTIONS OF TRAINING PROGRAMS OR
     MATERIALS, TRAINING OF STUDENTS AND
     PROFESSIONAL WORKING LIBRARIANS;
     ACADEMIC OR ON-THE-JOB TRAINING
D02  AUDIOVISUAL AIDS FOR
     ORIENTATION OR INSTRUCTION OF
     LIBRARY USERS
D03  EVALUATION OF PRIMARY SCHOOLS (GRADE
     K-3) ENGLISH READING PROGRAMS OR
     READING MATERIALS & TECHNIQUES (NOT
     EVALUATION OF SPECIFIC READING TEST
     OR INSTRUCTORS, NOT STUDENT TEST
     SCORES WHEN NOT PART OF EVALUATION
     OF READING PROGRAM, & NOT JUST THE
     CRITERIA OR STANDARDS FOR EVALUAT-
     ION) LIMIT TO PUBS.AVAIL.ERIC/EDRS
D04  FORMAL SCIENCE EDUCATION PROGRAMS
     IN UNIVERSITIES & SECONDARY GRADES
     9-12 IN SOVIET UNION (ALL SCIENCES
     INCL.MATH & ENGIN.?TAPDIF1 FOR MORE
? ?TAPDIF1
D05  VOCATIONAL EDUCATION OF AMERICAN
     INDIAN (HISTORY, DATA, & PROGRAMS TO
     PROVIDE THIS EDUCATION;BUT NOT
     TRAINING MATERIALS TO BE USED)
D06  EVALUATION OF BILINGUAL ELEMENTARY
     ELEMENTARY (K-8) & SECONDARY (9-12)
     SCHOOL PROGRAMS OR TECHNIQUES FOR
     SPANISH & ENGLISH LANGUAGES
```

D07 FINANCIAL COSTS TO INSTITUTIONS OF
HIGHER ED. TO IMPLEMENT LEGISLATED
AFFIRMATIVE ACTION PROGRAMS
D08 EVALUATION OF INDEXING & CATALOGING
(WORK,METHODS,PRODUCTS,LANGUAGES) TO
INCLUDE REPRESENTATION & STORAGE OF
THE INDEX INFO./INDEXING/INCLUDES
ALL FORMS OF TEXT SEARCHING,I.E.
INDEXING BY TEXT WORDS./EVALUATION/
IS TIME (COST, ERROR RATES, RECALL/
RELEVANCE, AND EVAL.CRITERIA) INDEX
ING INCLUDES CITATION INDEXING,
TITLE WORD INDEXING, OR AUTO INDEX
D09 COLLECTIVE BARGAINING IN LIBRARIES
OF INSTITUTIONS OF HIGHER EDUCATION

Forty-six documents are judged as being relevant to the information-need. In formulation #1, a minimum of online searching effort is expended. The results are as follows:

Formulation #1 (Briefsearch)

Number of citations found=62

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{24}{46}$ (52% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{24}{62}$ (39% of retrieved documents are relevant)

The Briefsearch performs well in terms of recall, capturing half of the relevant documents in the answer set. The information seeker, presented with the results of this search, does not have to sort through much non-relevant material, although 22 relevant items have been missed. On the other hand, formulation #3, which is constructed for high recall, retrieves all of the relevant items at the expense of retrieving a high volume of non-relevant items. Thus, the information seeker encounters four non-relevant documents for every five he reads (i.e., 18% precision).
Recall and precision ratios for all three parts of formulation #3 are listed below:

Formulation #3, part I (Using the general EVALUATION Search Save)

Number of citations found=253

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{46}{46}$ (100% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{46}{253}$ (18% of retrieved documents are relevant)

Formulation #3, part II (Using the restricted EVALUATION Search Save)

Number of citations found=200

$$\text{Recall}=\ \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad \frac{42}{46}$$ (92% relevant documents retrieved)

$$\text{Precision}=\ \frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad \frac{42}{200}$$ (21% of retrieved documents are relevant)

Formulation #3, part III (Using the abbreviated search for EVALUATION)

Number of citations found=58

$$\text{Recall}=\ \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad \frac{31}{46}$$ (67% relevant documents retrieved)

$$\text{Precision}=\ \frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad \frac{31}{58}$$ (53% of retrieved documents are relevant)

As formulation #3 proceeds, additional restricting factors are applied to the search. In part I the three facets are made up of two general Search Saves for EVALUATION and PRIMARY EDUCATION, and the occurrences of READING or READER in all subject-conveying fields. Here, all 46 relevant citations are retrieved; however, over 200 retrieved citations are not relevant to the information need.

In part II, the general EVALUATION Search Save and Search Save for PRIMARY EDUCATION are COMBINEd in an AND relationship with a restricted READING set. These limiting factors result in the loss of four relevant items; however, 53 non-relevant items are not included in the final set.

Additional restricting factors applied in part III of formulation #3 result in improved precision in exchange for a lower recall. Formulation #3, an example of the successive fractions approach to search strategy, performs well when a high recall is required, but the search objective as expressed by the information seeker is not satisfied since 80% of the output is not relevant to the search topic.

Search formulation #2, made up of restricted sets for EVALUATION and READING, works out surprisingly well in terms of precision and recall values. Furthermore, this formulation requires fewer search statements than the more complex and comprehensive strategy of formulation #3.

Formulation #2

Number of citations found=54

$$\text{Recall}=\ \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad \frac{30}{46}$$ (65% relevant documents retrieved)

$$\text{Precision} = \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{30}{54}$$ (56% of retrieved documents are relevant)

In view of the information-need expressed by the information seeker, the results of the Briefsearch or formulation #2 may be satisfactory. More relevant documents are retrieved in formulation #2 than the Briefsearch at the expense of drawing out some non-relevant material; however, the Briefsearch serves as a low cost formulation.

(Reader: Since there are a number of possibilities present in choosing among formulation, which would you select after reading the evaluation?______)

Relevant citations:

ED110543 ED110511 ED110510 ED110171 ED110170 ED110168 ED109934
ED109686 ED109674 ED109638 ED109632 ED109631 ED109592 ED109150
ED108791 ED108377 ED108201 ED108197 ED108196 ED108192 ED107372
ED107071 ED106750 ED106400 ED105440 ED105012 ED104999 ED104994
ED104925 ED104919 ED104527 ED103008 ED103004 ED100176 ED100175
ED099822 ED099820 ED099812 ED098494 ED098346 ED097645 ED097635
ED097104 ED096781 ED096780 ED096033

SCHOOL BUSING

Search Topic #5: Use of school busing to achieve racial integration.
(S AN=M08)

Step 3: Formulating Basic Search Logic--Planning Search Strategies

Two facets comprise the search topic: integration and busing. The concept of school could form another facet; however, since the type of school is not specified in the query, the facet of school will not be applied to the search results unless a large volume of output is retrieved in the formulation below.

Step 4: Compiling the Search Terms

The INTEGRATION aspect can be described by a number of ERIC descriptors, in comparison to BUSING which is only represented by three descriptors, e.g., bus transportation, student transportation, and school buses. Formulations constructed for free text searching can include variant forms of the busing and desegregation since neither term is used singly as a descriptor.

Step 5: Ordering Output

No output specifications are stated in the information need. Thus, the discussion will cover three different search strategies in order to illustrate how each of these approaches is employed to achieve one of three objectives: high recall, high precision, or low cost.

Step 6: Conceptualizing the Search as Input to the Retrieval System

Whether to survey the file or gather additional searching vocabulary, the Briefsearch given below retrieves a high percentage of relevant items at a low cost.

Briefsearch	Comments
1 SS (STUDENT(W)TRANSPORT? OR BUSING) AND (INTEGRAT? OR SEGREGAT?)	The single search statement retrieves 37 citations. At this point, it is not felt necessary to add the third facet SCHOOL to the formulation and the search is terminated.

As a result of evaluating the Briefsearch, it is decided that the third facet of SCHOOL will not be included in the high recall formulation, an example of the building block approach, which follows:

Formulation #2	Comments
1 SS BUS OR BUSES OR BUSING OR BUSED OR BUSSES OR BUSSING OR BUSSED	Using truncation to retrieve the many possible forms of BUS would probably result in a large number of false drops. Each form is typed in separately rather than entering BUS?.
9 SS (STUDENT AND TRANSPORTATION) OR S8	Included DESCRIPTORS/ Identifiers: BUS TRANSPORTATION, SCHOOL BUSES/ Bus Drivers, Bus Driver Training.
12 SS RACIAL? OR INTEGRAT? OR DESEGREGAT? OR SEGREGAT?	Included DESCRIPTORS/ Identifiers: 22 INTEGRATED and INTEGRATION DESCRIPTORS, SEGREGATED PUBLIC FACILITIES, 7 SEGREGATION DESCRIPTORS, SEGREGATIONIST ORGANIZATIONS /Desegregation Aid, Aid, Desegregation Advisory Project.
17 C 11 AND 16	

Formulation #3 is an example of the lowest postings facet first approach. Expected to produce high precision, the strategy involves the development and evaluation of the facet BUSING before the application of the second facet INTEGRATION.

Formulation #3	Comments
1 SS STUDENT TRANSPORTATION OR BUS TRANSPORTATION OR SCHOOL BUSES	Using ERIC descriptors to create a set of documents for the facet BUSING should result in high precision since only the assigned index fields are scanned.
	At this point, 62 citations are retrieved. The searcher could end the search now, but decides to add the second facet INTEGRATION which is constructed using free text searching.
5 S INTEGRAT? OR DESEGRAT? OR SEGREGAT?	
9 C 4 AND 8	The BUSING facet is reduced to only those documents containing search terms for INTEGRATION in any of the four subject-conveying fields.

Step 8: Evaluating Final Results

The Briefsearch is remarkably accurate in terms of retrieving relevant documents as reflected by high precision. However, all 42 of the relevant items in the file are not retrieved by this formulation. The Briefsearch is favored if high precision and low cost are search objectives.

Briefsearch

Number of citations found=37

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{34}{42}$$ (81% relevant documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{34}{37}$$ (92% of retrieved documents are relevant)

On the other hand, if high recall is desired by the requestor, formulation #2, the building block approach, in which free text searching is used, may be preferred. Capturing all the relevant items, the formulation also results in retrieving a high volume of non-relevant citations.

Formulation #2

Number of citations found=62

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{42}{42}$$ (100% relevant documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{42}{62}$$ (68% of retrieved documents are relevant)

Formulation #3, in which high precision is intended, achieves that objective. Developing the BUSING facet by descriptor terms alone is not suitable, in this case, to effect high recall also.

Formulation #3

Number of citations found=29

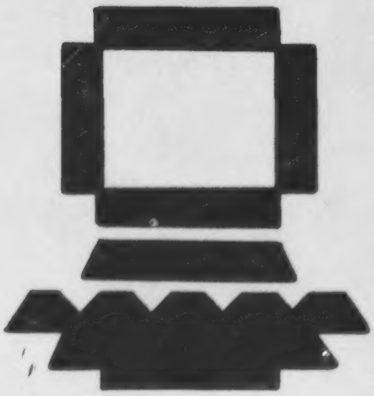
$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{26}{42}$$ (60% relevant documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{26}{29}$$ (90% of retrieved documents are relevant

There is a "tradeoff" in each of the formulations. For example, formulation #3 achieves high recall at the risk of retrieving much non-relevant material. At the expense of recall, the Briefsearch is a low cost, high precision formulation. Compare your search formulations with those given. Check to see whether you have compromised in order to achieve high recall, or vice versa.

Relevant citations:

EJ 121907 EJ 121906 EJ 121889 EJ 121888 EJ 121886 EJ 121885
EJ 120204 EJ 115861 EJ 115858 EJ 115853 EJ 115849 EJ 115809
EJ 115252 EJ 114427 EJ 113526 EJ 113504 EJ 111820 EJ 110130
EJ 110129 EJ 110036 EJ 108492 EJ 108055 EJ 107317 EJ 107301
EJ 106768 EJ 105109 EJ 103409 EJ 103405 EJ 103347 ED 110551
ED 110533 ED 109745 ED 106425 ED 106397 ED 105554 ED 103546
ED 103288 ED 102279 ED 102242 ED 101045 ED 101018 ED 099258



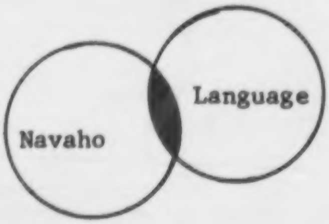
LANGUAGE TEXTBOOKS

Search topic #6: Navaho language textbooks or grammars (material in Navaho or useful for teaching Navaho, or about Navaho linguistics). (S AN=S05)

Search Objective: The information seeker is interested in gathering as much information as possible on this topic at the lowest cost.

Step 3: Formulating Basic Search Logic--Planning Search Strategies

Two concepts are present in the topic: Navaho and language. The diagram below illustrates the search logic; the shaded section represents the portion of the database intended for retrieval.



Step 4: Compiling the Search Terms

There is sufficient terminology for expressing the facet LANGUAGE in assigned index terms. The NAVAHO facet can be represented by a single descriptor, so that related terms such as American Indian Languages or American Indian Culture could be introduced to the formulation; however, these terms may retrieve items treating American Indian Languages as well as the Navaho language.

Step 5: Ordering Output

Selecting an approach to search strategy should take into consideration the search objectives: high recall and low cost. The most specific facet first approach, since it permits the searcher to terminate the search before introducing all facets to the formulation, is preferred, as well as the Briefsearch. Developing a high precision formulation is also necessary as the cost of the search involves offline prints as well as online connect time.

Step 6: Conceptualizing the Search as Input to the Retrieval System

A Briefsearch is constructed by taking variant spellings of Navaho and combining them with the search term Language using the AND operator. The (C) limiter could be used instead of the AND operator.

Briefsearch	Comments
1 SS NAVA?O? ? AND LANGUAGE?	Different spellings of NAVAHO are easily retrieved employing DIALOG's truncation feature; since the root of the term is not common to many words, few false drops should occur.

The Briefsearch retrieves 20 citations; the searcher could end the search at this point or continue developing these statements into a more complex formulation. Formulation #2 incorporates terms taken from the search topic into the LANGUAGE facet. A greater volume of output can be expected as citations are retrieved which contain not only Language, but Textbooks or Books, or Grammars, etc.

Formulation #2	Comments
4 SS BOOK? OR GRAMMAR? OR LINGUISTIC? OR TEXTBOOK? OR S2	Formulation #2 uses the groundwork provided by the Briefsearch; in this way, the searcher does not have to backtrack to create sets for NAVAHO and LANGUAGE.
9 C 3 AND 8	

(Reader: After executing your own search and reviewing the sample formulations, which formulation would you select? Keep in mind that the requestor is concerned about cost. ____________)

Step 8: Evaluating Final Results

The Briefsearch manages to capture eight of the nine relevant items in the ONTAP file. Only three search statements are entered in this formulation, keeping online connect time at a minimum.

Briefsearch

Number of citations found=20

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{8}{9}$$

(89% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{8}{20}$$

(40% of retrieved documents are relevant)

The Briefsearch retrieves only eight of the nine relevant documents, and the second formulation fared the same; however, three additional nonrelevant citations are picked up as a result of including more search terms in the development of the LANGUAGE facet.

Formulation #2

Number of citations found=23

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{8}{9}$$

(89% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{8}{23}$$

(35% of retrieved documents are relevant)

Both formulations fail to retrieve the same item (ED 104 168) judged as being relevant to the topic; curious to find out why the document is missed, we printed it in full format. No portion of the record mentions *specifically* the Navaho language; it deals generally with North American Indian languages, so that its relevance to the topic may be questioned.

Relevant citations:

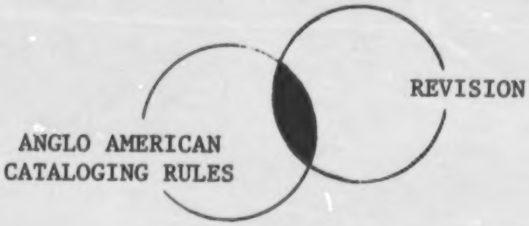
EJ 111077 EJ 111075 ED 108801 ED 104168 ED 102820 ED 102585
ED 101549 ED 101152 ED 100136

AACR REVISION

Search topic #7: Revision of the Anglo-American Cataloging
Rules. (S AN=S04)

Step 3: Formulating Basic Search Logic--Planning Search Strategies

Two concepts are present in the topic: REVISION and ANGLO-AMERICAN CATALOGING RULES. The shaded section in the diagram below indicates the portion of the database intended for retrieval.



Step 4: Compiling Search Terms

Anglo American Cataloging Rules, AACR, or revision are not included as descriptors in the ERIC *Thesaurus* so much of the formulation will consist of free text searching. A high precision search would be restricted to the identifier and title fields.

Step 5: Ordering Output

No output specifications are identified in the query. The formulations give examples of the Briefsearch, building block approach, and a high recall formulation in which the identifier and title fields are searched.

Step 6: Conceptualizing the Search as Input to the Retrieval System

Formulation #1 serves as an example of the building block approach. All subject-conveying portions of the ERIC record are searched for occurrences of the search terms as free text searching is employed.

Formulation #1	Comments
1 SS (AACR OR ANGLO(1W) CATALOGING) AND REVIS?	Since the Rules can be spelled with or without a hyphen, this statement retrieves both forms.

A high precision search uses nearly the same terms, but the searcher scans the basic index of identifiers to find out how the ANGLO-AMERICAN facet is expressed in the database terminology.

Formulation #2

```
? EANGLO AMERICAN/ID
Ref Items  Index-term              RT
E1      3  ANGLICISMS
E2    137  ANGLO
E3        *ANGLO AMERICAN
E4      8  ANGLO AMERICAN
             CATALOGING RULES
E5      1  ANGLO AMERICAN
             HISTORIANS CONFERENCE
E6      1  ANGLO AMERICAN RELATIONS
E7         ANGLO SAXON              1
E8      6  ANGULAR
E9      1  ANGULAR MOMENTUM
E10   108  ANIMAL
E11        ANIMAL BIOLOGY           1
E12        ANIMAL CARETAKERS        9
E13     2  ANIMAL COMMUNICATION
E14        ANIMAL KEEPERS           1
E15        ANIMAL LIFE              1
                                -more-

1 SS E7 AND REVISION
```

Step 8: Evaluating Final Results

Formulation #1

Number of citations found=5

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{3}{3}$$ (100% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{3}{5}$$ (60% of retrieved documents are relevant)

Formulation #2

Number of citations found=3

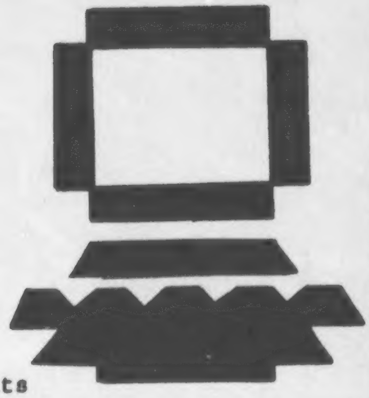
$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{3}{3}$$ (100% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{3}{3}$$ (100% of retrieved documents relevant)

After reviewing the recall and precision scores summarized above, it is clear that no one formulation is favored; all perform well and are efficient and accurate.

Relevant citations:

EJ 121112 ED 108684 ED100292

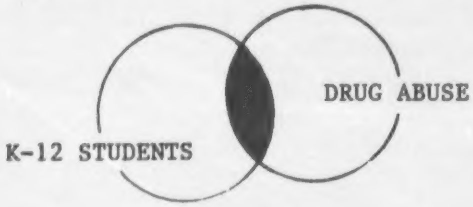


DRUG ABUSE

Search topic #8: Drug abuse including alcohol, among students of elementary and secondary schools, grades K-12. (S AN=M07)

Step 3: Formulating Basic Search Logic--Planning Search Strategies

The search topic can be broken down into two facets: DRUG ABUSE and K-12 STUDENTS. The diagram below shows that the intersection of the two facets is the portion of the database intended for retrieval.



Step 4: Compiling the Search Terms

This search is simplified by the availability of ERIC descriptors for DRUG ABUSE and for student grade level. A high recall search may contain the names of specific drugs such as marihuana or LSD.

Step 5: Ordering Output

It is anticipated that the volume of literature on the topic will be quite substantial; consequently, both facets will probably be introduced to the formulation. The building block approach is used in all three formulations below for a high recall and high precision search, and Briefsearch; the building block approach is characterized by the development and union of all search facets.

Step 6: Conceptualizing the Search as Input to the Retrieval System

Each search statement in the Briefsearch given below is an example of the building block approach as both facets, DRUG ABUSE and K-12 STUDENTS are present. Search terms chosen for the Briefsearch are derived from ERIC descriptors having high postings or used frequently in descriptor phrases.

Briefsearch

```
1 SS (ELEMENTARY OR HIGH(W)SCHOOL) AND
     (ALCOHOL? OR DRUG(W)ABUSE)
```

Formulation #2 relies on searching the controlled vocabulary and title fields to produce a high precision search.

Formulation #2

```
1 SS DRUG(W)ABUSE/DE,ID,TI OR
     ALCOHOL?/DE,TI,ID

4 SS ELEMENTARY(W)SCHOOL?/DE,ID,ID
     OR HIGH(W)SCHOOL?/DE,TI,ID OR
     SECONDARY(W)SCHOOL?/TI,ID,DE

8 C 3 AND 7
```

Comprehensive Search Saves for grade levels K-8 (Search Save #2, see appendix) and grade levels 9-12 (Search Save #3, see appendix) are used in the following high recall formulation to create the K-12 STUDENTS facets. The DRUG ABUSE facet is comprised of individual drug names in addition to general terms such as narcotics, drug addiction, etc.

Formulation #3	**Comments**
1 .EXECUTE________(Search Save for ELEMENTARY EDUCATION)	
2 .EXECUTE________(Search Save for SECONDARY EDUCATION)	Statements 1 and 2 create the set for K-12 STUDENTS.
3 S ALCOHOL?	Included DESCRIPTORS and Identifiers: ALCOHOL EDUCATION, ALCOHOLIC BEVERAGES, ALCOHOLISM /Alcohol, 4 multi-term alcohol identifiers; DRUG ABUSE, 5 multi-term drug abuse identifiers; DRUG ADDICTION, LYSERGIC ACID DIETHYLAMIDE, MARIHUANA, NARCOTICS, 2 multi-term Narcotics identifiers.
4 S DRUG(W)ABUSE	
5 S DRUG(W)USE	
6 S DRUG(W)ADDICT?	
7 S LSD	
8 S LYSERGIC	
9 S MARI?UANA?	DIALOG's truncation feature allows variant spellings of the term to be retrieved.
10 S NARCOTIC?	
11 C 3-10/OR	
12 C 11 AND (1 OR 2)	

Step 8: Evaluating Final Results

Both the Briefsearch and formulation #2 are favored in instances when high precision is required. Simple, efficient and requiring little typing, the searches retrieve few non-relevant documents.

Briefsearch

Number of citations found=49

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{44}{65}$ (68% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{44}{49}$ (90% of retrieved documents are relevant)

Formulation #2

Number of citations found=22

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{21}{65}$ (32% relevant documents /retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{21}{22}$ (95% of retrieved documents are relevant)

Search formulation #3 is preferred for high recall searches. More online connect time is necessary than with formulations #1 or #2, as more terms are entered and Search Saves are processed. However, all relevant documents are retrieved with a minimum of nonrelevant items.

Formulation #3

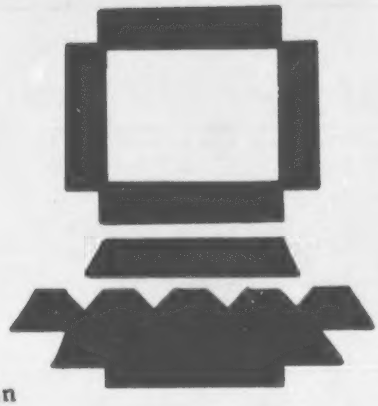
Number of citations found=87

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{65}{65}$ (100% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{65}{87}$ (75% of retrieved documents are relevant)

Relevant citations:

EJ119196 EJ118984 EJ118982 EJ118979 EJ117327 EJ116766 EJ115585
EJ115584 EJ115581 EJ115577 EJ114039 EJ114035 EJ114034 EJ114033
EJ114032 EJ114029 EJ110527 EJ110132 EJ108320 EJ107353 EJ107314
EJ105590 EJ105584 EJ105583 ED110574 ED109914 ED109844 ED109165
ED109069 ED109063 ED108016 ED107899 ED107664 ED107663 ED107618
ED107572 ED107550 ED106987 ED106719 ED106706 ED104786 ED104620
ED104006 ED103756 ED103746 ED103461 ED103361 ED102658 ED101866
ED101499 ED101464 ED101256 ED100642 ED100610 ED100597 ED099720
ED099398 ED099354 ED099338 ED098465 ED098181 ED097604 ED097234
ED096577 ED095691



VOCATIONAL EDUCATION

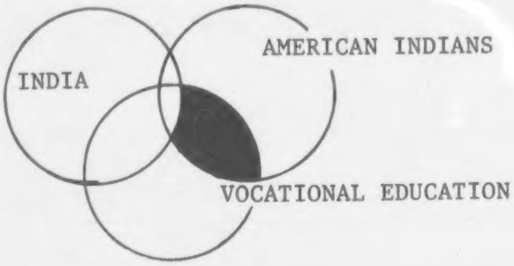
Search topic #9: Vocational education of the American Indian (history, data and programs to provide this education but not training materials to be used in these educational programs). (S AN=D05)

Search Objective: The requestor wants all the relevant material in the ONTAP file.

Step 3: Formulating Basic Search Logic--Planning Search Strategies

Two concepts are present in the topic: VOCATIONAL EDUCATION and AMERICAN INDIANS. Although the requestor is not interested in training materials, this aspect of the search will be difficult to represent in the formulation without eliminating some relevant items which contain information on industrial training. Errors in indexing the concept AMERICAN INDIANS may occur so that a set representing INDIA will be created and joined in a NOT relationship with the facet for AMERICAN INDIANS. In this way, material dealing with American Indians but indexed as INDIANS would be retrieved. (INDIANS is used as an ERIC descriptor to describe "natives of India or of the East Indies," according to the scope note in the ERIC Thesaurus.)

The search logic is illustrated in the diagram below; the shaded area is the portion of the database intended for retrieval. Note that the intersection of all three sets is not wanted, rather the intersection of the two sets for VOCATIONAL EDUCATION and AMERICAN INDIANS is desired in all cases where the term INDIA does not occur.



Step 4: Compiling the Search Terms

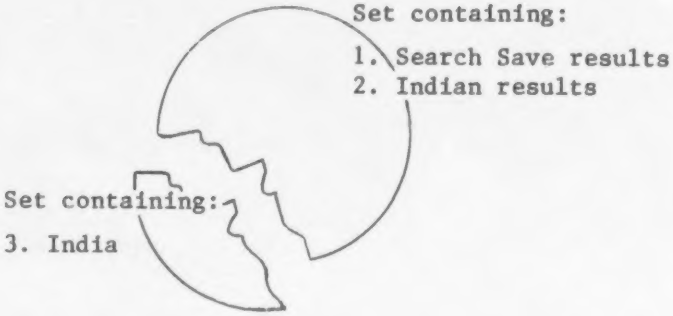
The VOCATIONAL EDUCATION aspect is well represented in the ERIC Thesaurus by a host of terms. Use can be made of the online thesaurus instead of typing in a number of terms and risking typing errors. For a high recall search, several expressions must be entered to represent AMERICAN INDIANS, particularly individual tribal names. Formulation #2 below employs Search Save #5 (see appendix) on general Indian names; however, a more comprehensive Search Save containing nearly all tribal names of North American Indians could be devised for high recall searches.

Step 5: Ordering Output

The search objective, to retrieve all relevant citations in ONTAP, plays a part in determining what approach to search strategy should be employed. Since neither facet, AMERICAN INDIANS nor VOCATIONAL EDUCATION, could represent the topic alone without containing much non-relevant material, it is expected that both facets will be involved in the formulation. Thus, the building block approach appears to be a suitable choice; however, the successive fractions approach could also be employed to execute a comprehensive subsearch for AMERICAN INDIANS; in this way, items indexed erroneously and/or dealing with American Indians but not referring to them specifically are retrieved.

Step 6: Conceptualizing the Search as Input to the Retrieval System

Formulation #1 is an example of the successive fractions approach. In the first four search statements, the facet AMERICAN INDIANS is built by using Search Save #5 and the search terms India and Indian; then, the set for INDIA is partitioned from the AMERICAN INDIAN set. The following diagram illustrates this process; the shaded area represents that portion of the database which is treated in subsequent statements for the formulation; the unshaded area is, literally, discarded.



The full formulation is given below:

Formulation #1	Comments
1 .EXECUTE ________(Search Save for AMERICAN INDIANS)	
2 SS (INDIAN NOT INDIA) OR S1	Statements 2-4 draw out material on INDIAN and INDIA. The set for INDIA is then COMBINEd in a NOT relationship with the AMERICAN INDIAN facet in order to eliminate items on India that may be non-relevant.
5 S INDUSTRIAL(W)ARTS OR INDUSTRIAL(W)EDUCATION OR VOCATION? OR INDUSTRIAL(W)TRAINING OR TRAINING(W)METHOD?	Statements 5-9 comprise the facet of VOCATIONAL EDUCATION.
11 C 4 AND 10	

In Formulation #2, the searcher employs the online rotated descriptor display to find controlled vocabulary terms that contain but may not begin with the term "INDIAN." After selecting terms to represent the AMERICAN INDIANS facet, the searcher uses the online ERIC Thesaurus to display and select terms conceptually related to VOCATIONAL or INDUSTRIAL EDUCATION. In this example, the searcher has done a minimum of typing by accessing these two online vocabulary aids.

Formulation #2

```
? EZZ=INDIANS
Ref Items  Index-term
E1      1  ZZ=INDIAN LITERATURE//
             AMERICAN
E2     80  ZZ=INDIAN RESERVATIONS//
              AMERICAN
E3    524 *ZZ=INDIANS
E4    479  ZZ=INDIANS// AMERICAN
E5      9  ZZ=INDIANS// NONRESERVAT
             ION AMERICAN
E6      3  ZZ=INDIANS// URBAN
             AMERICAN
E7    125  ZZ=INDICATORS
E8     15  ZZ=INDICATORS// SOCIAL
E9   2509  ZZ=INDIVIDUAL
E10    14  ZZ=INDIVIDUAL ACTIVITIES

         ? SE1-E3,E4-E6
         1   550 E1-E3,E4-E6
                 E3:  ZZ=INDIANS


? E(INDUSTRIAL EDUCATION)
Ref Items  Index-term             Type RT
R1    120  INDUSTRIAL EDUCATION
              (ALL TYPES OF EDUCAT   10
R2  21748  EDUCATION                B133
R3    138  INDUSTRIAL ARTS          R 28
R4     18  INDUSTRIAL ARTS TEACHERSR  5
R5     72  INDUSTRIAL TRAINING      R 21
R6    793  INDUSTRY                 R 33
R7     29  LABOR EDUCATION          R  8
R8    289  TECHNICAL EDUCATION      R 28
R9    197  TRADE AND INDUSTRIAL
             EDUCATION              R 26
                                   -more-

? P
Ref Items  Index-term             Type RT
R10    11  TRADE AND INDUSTRIAL
             TEACHERS               R  4
R11   991  VOCATIONAL EDUCATION     R 47
```

```
? SR1,R3,R5,R11
        2  1211  R1,R3,R5,R11
           R1:  INDUSTRIAL EDUCATION (AL
        3 C 1-2/AND
```

Step 8: <u>Evaluating Final Results</u>

Before reviewing the evaluation of the two formulations, how well does your search perform in terms of recall and precision? Twenty-one citations are judged as being relevant. Did you retrieve <u>all</u> the relevant documents?

The results of the high recall formulation reveal that <u>all</u> relevant citations are retrieved.

<u>Formulation #1</u>

Number of citations found=33

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{21}{21}$$

(100% relevant documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{21}{33}$$

(64% of retrieved documents are relevant)

Formulation #2, which employed the online thesaurus and <u>rotated</u> thesaurus displays improved in terms of precision, but only a third of the total number of relevant documents are retrieved.

<u>Formulation #2</u>

Number of citations found=10

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{8}{21}$$

(38% relevant documents retrieved)

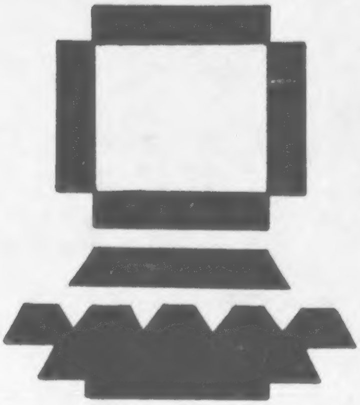
$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{8}{10}$$

(80% of retrieved documents are relevant)

The question of which formulation is preferred in this case is left to you, the searcher.

Relevant citations:

EJ 113861 EJ 112180 ED 109445 ED 108822 ED 108816 ED 108797 ED 108464
ED 107424 ED 107396 ED 107395 ED 101313 ED 101167 ED 100542 ED 100541
ED 100539 ED 100437 ED 098000 ED 097483 ED 097163 ED 096073 ED 095410



PIAGET

Search topic #10: Jean Piaget's theories, and thought processes or language development of children. (S AN=M03)

Search Objective: All relevant citations are wanted by the requestor; no journal articles are desired.

Step 3: Formulating Basic Search Logic--Planning Search Strategies

PIAGET represents one facet of the search. Piagetian theories, language development, and thought processes comprise aspects of the second facet, which is referred to as THEORIES in this discussion. CHILDREN forms the third facet as the requestor desires information on theories about Children, thought processes of Children, or language development of Children.

Step 4: Compiling the Search Terms

To incorporate Piagetian theories in the formulation, the searcher must be aware of the vocabulary and terminology associated with Piaget's work. The need to include many variant or synonymous expressions for the theories adds to the complexity of this search. The ERIC *Thesaurus* and *Thesaurus of Psychological Index Terms* are valuable sources for gathering such search terms. In search formulation #4, terminology for thought processes, language development, and Piagetian theories make up a substantial portion of the search.

Step 5: Ordering Output

Since the output is limited to publications available from EDRS, the second step in every formulation is the LIMIT command; this restricts the results of the first facet to the appropriate body of documents and allows the searcher to monitor preliminary results in the light of one of the search objectives.

Beginning with the most specific aspect of the search, PIAGET, the searcher may decide to terminate the search without adding another facet to the formulation. Examples of the most specific aspect first, building block, and Briefsearch are given. The COMMENTS section of each formulation explains the searcher's decisions during the preliminary evaluation process.

Step 6: Conceptualizing the Search as Input to the Retrieval System

A Briefsearch, performed initially before a complex formulation, gives a rough estimation of the size of the final output. Records from Briefsearch results can be reviewed in order to collect additional searching vocabulary.

Briefsearch

SS PIAGET? AND (CHILD? OR COGNITIVE)

5 LIMIT 4/AVAIL

At this point 89 citations are retrieved. Searching on the most specific facet, PIAGET, and comparing the results of this statement with that of the Briefsearch gives us a general idea how large the final set may be.

Formulation #2	Comments
1 S PIAGET?	Included DESCRIPTORS and Identifiers: Piaget, 17 multi-term Piaget Identifiers, Piagetian, 9 multi-term Piagetian Identifiers.
2 LIMIT 1/AVAIL	This search retrieves 93 citations. Since the requestor wants all relevant items, the searcher may consider terminating the search at this point, having determined that the volume of output is small enough for manual review.

The addition of the facet CHILDREN to the formulation reduces the output to 77 citations. This size of output may be considered sufficient to forego the introduction of another facet to the formulation.

Formulation #3	Comments
3 .EXECUTE ________(Search Save for CHILDREN)	Search Save #4 (see appendix) is used for the CHILDREN facet.
4 C 2 AND 3	

The fourth formulation is comprised of two facets, THEORIES and PIAGET. It requires much typing so that using the online thesaurus may be favored instead of employing free text searching.

Formulation #4	Comments
1 S PIAGET?	Just as in formulation #3, the first two statements are taken from formulation #2 and make up the entire facet PIAGET.
2 LIMIT 1/AVAIL	
3 S AFFECTIVE(W)BEHAVIOR	Included DESCRIPTORS/ Identifiers: AFFECTIVE BEHAVIOR.

Formulation #4 (cont.)	Comments
4 S COGNITIVE(W)ABILIT?	COGNITIVE ABILITY/ Cognitive Abilities Test.
5 S COGNITIVE(W)DEVELOPMENT?	COGNITIVE DEVELOPMENT/ Cognitive Development Research Tools.
6 S COGNITIVE(W)OBJECTIVE?	COGNITIVE OBJECTIVES.
7 S INTELLECTUAL(W)DEVELOPMENT?	INTELLECTUAL DEVELOPMENT.
8 S MENTAL(W)DEVELOPMENT	MENTAL DEVELOPMENT.
9 S PERCEPTUAL(W)DEVELOPMENT	PERCEPTUAL DEVELOPMENT.
10 S ECHOLALIA	ECHOLALIA.
11 S FLES	FLES, FLES GUIDES, FLES MATERIALS, FLES PROGRAMS, FLES TEACHERS/ FLES Objectives, FLES Program.
12 S READING(W)HABIT?	READING HABITS.
13 S HUMAN(W)DEVELOPMENT	HUMAN DEVELOPMENT/ 3 multi-term Human Development Identifiers.
14 S LANGUAGE?	LANGUAGE, over 60 multi-term LANGUAGE DESCRIPTORS, 31 LANGUAGES DESCRIPTORS/ 50 multi-term Language Identifiers.
15 S LINGUISTIC?	LINGUISTICS, 13 multi-term LINGUISTICS and LINGUISTIC DESCRIPTORS/ 26 multi-term Linguistic and Linguistics Identifiers.
16 S NUCLEATION	NUCLEATION (LANGUAGE LEARNING).
17 S PSYCHOLINGUISTIC?	PSYCHOLINGUISTICS.
18 S READING(W)DEVELOPMENT	READING DEVELOPMENT.
19 S SPEECH(W)DEVELOPMENT	RETARDED SPEECH DEVELOPMENT.
20 S SPEECH(W)HABITS	SPEECH HABITS.
21 S VERBAL(W)DEVELOPMENT	VERBAL DEVELOPMENT.
22 S VOCABULARY(W)DEVELOPMENT	VOCABULARY DEVELOPMENT.

Formulation #4 (cont.)	Comments
23 S HANDWRITING(W)DEVELOPMENT	HANDWRITING DEVELOPMENT.
24 S S3-S28/OR AND S2	Cumulative set for cognitive and language development.

Imposing the facet PIAGETIAN THEORIES reduces the final set to 73 citations. At this point, the searcher terminates the search in order to avoid losing relevant material. The searcher could incorporate the CHILDREN facet into the search using the Search Save demonstrated in formulation #3, but chooses to terminate the search to avoid losing relevant material.

(Reader: In light of the requestor's desire to retrieve all relevant citations regardless of cost, which strategy do you prefer?__________)

Step 8: Evaluating Final Results

Formulation #2, in which the most specific facet of the topic is searched, retrieves all 81 relevant citations. It is the only formulation of those given which achieves 100% recall.

Formulation #2

Number of citations found=93

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{81}{81} \quad \text{(100\% relevant documents retrieved)}$$

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{81}{93} \quad \text{(87\% of retrieved documents are relevant)}$$

The Briefsearch achieves high precision and recall but does not retrieve all items relevant to the topic. But, used as a brief survey of the file, it aids in determining whether to impose a second facet to the formulation.

Briefsearch

Number of citations found=89

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{78}{81} \quad \text{(96\% relevant documents retrieved)}$$

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{78}{89} \quad \text{(88\% of retrieved documents are relevant)}$$

Two facets of the topic, CHILDREN and PIAGET, make up formulation #3. Imposing the CHILDREN aspect into the formulation eliminates one relevant document from the output. The loss in recall and precision is not very great, but it is recommended that searchers forego the incorporation of the CHILDREN facet into the search because it requires more typing and connect time than the simpler formulations, #1 and #2.

Formulation #3

Number of citations found=77

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{67}{81}$ (83% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{67}{77}$ (87% of retrieved documents are relevant)

The THEORIES facet is fully developed in formulation #4. Although this formulation results in high precision, it requires much pre-search preparation as the searcher must gather search terms representing Piaget's theories.

Formulation #4

Number of citations found=73

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{72}{81}$ (89% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{72}{73}$ (99% of retrieved documents are relevant)

Since high recall is one of the search objectives, formulation #2 is preferred. Not only does it achieve a high recall score, but it is efficient and rapid in terms of online connect time and pre-search preparation.

Relevant citations:

ED 110469 ED 110190 ED 110186 ED 110173 ED 110159 ED 109196 ED 109149
ED 108957 ED 108893 ED 108864 ED 108862 ED 108751 ED 108748 ED 108745
ED 108404 ED 107562 ED 107385 ED 107366 ED 106721 ED 106147 ED 106131
ED 106122 ED 106117 ED 106042 ED 105979 ED 105976 ED 104739 ED 104552
ED 104530 ED 104516 ED 104051 ED 103296 ED 103133 ED 103129 ED 103127
ED 103106 ED 103100 ED 103095 ED 102240 ED 102111 ED 101849 ED 101847
ED 101837 ED 101565 ED 101488 ED 100704 ED 100536 ED 100529 ED 100528
ED 100521 ED 100510 ED 100488 ED 100485 ED 099811 ED 099767 ED 099415
ED 099196 ED 099122 ED 099112 ED 099098 ED 098793 ED 098517 ED 098490
ED 098082 ED 097991 ED 097984 ED 097977 ED 097970 ED 097959 ED 097957
ED 097379 ED 097261 ED 097129 ED 097110 ED 097109 ED 097102 ED 096016
ED 096000 ED 095999 ED 095997 ED 095996

CHARGING FOR LIBRARY SERVICES

Search Topic #11: Direct charging to users for reference and current awareness service of libraries or other information services (philosophy, policy, practice, fee charges; any type of library; any type of reference service; not interested in free services). (S AN=M01)

Search Objective: High precision.

Steps 3 and 4: Formulating Basic Search Logic and Compiling the Search Terms

The search topic is broken down into two facets: CHARGING and REFERENCE SERVICES. Since there is only one descriptor available to express the CHARGING facet, i.e., Fees, the searcher can check Roget's Thesaurus for synonyms to incorporate into the search strategy as free text, e.g. costs, charges, payment, etc. The REFERENCE SERVICES facet is well represented in the controlled vocabulary so that the searcher should consider accessing the online thesaurus to save time typing in search statements.

Step 5: Ordering Output

Since the information seeker requests a high precision search, a high precision formulation features search terms derived from the controlled vocabulary. Only one term, Fees, is available from the controlled vocabulary to express the CHARGING facet, but there are many controlled vocabulary terms available for expressing the REFERENCE SERVICES facet.

Step 6: Conceptualizing the Search as Input to the Retrieval System

The Briefsearch can be used to make a quick survey of the ERIC file and to gather searching vocabulary to express the CHARGING facet.

Briefsearch

```
1 SS (REFERENCE(W)SERVICE? OR INFORMATION(W)SERVICE?) AND FEE? ?
```

In formulation #2, the search builds the REFERENCE SERVICES facet by selecting relevant terms from the online thesaurus. These controlled vocabulary terms from the online thesaurus are then combined with free text terms representing the CHARGING facet.

Formulation #2

```
?  E(INFORMATION SERVICES)
Ref Items  Index-term              Type RT
R1    176  INFORMATION SERVICES
             (THE ACTIVITIES (E.G    16
R2     21  COMMUNITY INFORMATION
             SERVICES              N 12
R3    381  INFORMATION
             DISSEMINATION         N 25
R4    197  INFORMATION PROCESSING  N 16
R5    374  LIBRARY SERVICES        N 25
R6     79  REFERENCE SERVICES      N  8
R7   3018  SERVICES                B 17
R8     79  INFORMATION CENTERS     R  9
R9    154  INFORMATION NEEDS       R 13
                                  -more-

? P
Ref Items  Index-term              Type RT
R10   109  INFORMATION NETWORKS    R 14
R11    59  INFORMATION SCIENCE     R 15
R12    44  INFORMATION SEEKING     R 11
R13   159  INFORMATION SOURCES     R 17
R14   298  INFORMATION SYSTEMS     R 22
R15   112  INFORMATION UTILIZATION R 17
R16   916  LIBRARIES               R 37
R17        USER SATISFACTION
             (INFORMATION)         R 12
1  SR1, R5, R6, R8, R13

2  SS (CHARG? OR FEE? ?) AND S1
```

Comments

The descriptor Information Services is expanded in the on-online dictionary.

The two facets are COMBINEd using DIALOG's SuperSELECT feature.

Step 8: Evaluating Final Results

Both formulations perform quickly and efficiently. Over half of the documents retrieved by formulation #2 in which the online thesaurus is used are not relevant to the search topic. In contrast, Briefsearch results in a perfect precision score even though it relies on free text searching. The recall and precision scores for both formulations are summarized below:

Briefsearch

Number of citations found=6

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{6}{8}$$

(75% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{6}{6}$$

(100% of retrieved documents are relevant)

Formulation #2

Number of citations found=17

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{8}{8}$$

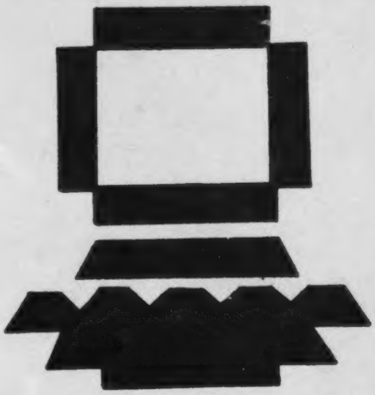
(100% relevant documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{8}{17}$$

(47% of retrieved documents are relevant)

Relevant citations:

EJ111325 EJ111322 ED107277 ED107226 ED104370 ED100309
ED098924 ED096982



WHITE FLIGHT TO THE SUBURBS

Search Topic #12: White Flight to the Suburbs.
(S AN=M11)

Step 3: Formulating Basic Search Logic--Planning Search Strategies

Three facets are present in the search topic: WHITES, FLIGHT, and SUBURBS. Besides the usual Briefsearch, let us consider employing the most specific facet first approach. The latter approach consists of starting a multi-faceted formulation with the most specific aspect of the topic that is not likely to suffer from any vagueness of indexing. In this topic, the phrase "White Flight" is suitable for beginning the most specific facet first approach.

Step 4: Compiling the Search Terms

This search is moderately difficult because there are no ERIC descriptors available for expressing two of the three facets, i.e. WHITES and FLIGHT. The descriptor Urban to Suburban Migration adequately describes the SUBURBS and FLIGHT facets, but the descriptor only covers the ERIC literature from 1976 to the present. Since the controlled vocabulary does not cover the topic, free text searching is featured in the formulation.

Step 5: Ordering Output

No output specifications are given.

Step 6: Conceptualizing the Search as Input to the Retrieval System

The Briefsearch includes only the phrase White Flight and is used as a stepping stone to the more complex most specific facet first approach of formulation #2.

Briefsearch

```
1 S WHITE?(W)FLIGHT
```

Five documents are retrieved as a result of the Briefsearch. It is incorporated into Formulation #2 in which the third facet of SUBURBS is introduced.

Formulation #2	Comments
1 S WHITE?(W)FLIGHT	Repeats the single search statement of the Briefsearch.
2 SS (SUBURB? AND WHITE?) OR S1	The results of the Briefsearch are combined in an OR relationship with the combination of WHITE? and SUBURB?

Step 7: Evaluating Final Results

Both formulations are quick and efficient. The Briefsearch is a high precision search; this is obvious considering the specificity of the search terms of which it is constituted.

Briefsearch

Number of citations found=5

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{4}{5}$ (80% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{4}{5}$ (80% of retrieved documents are relevant)

In Formulation #2, the results of the Briefsearch are included in a final set which is created from terms more general than those of the Briefsearch. Thus, precision decreases.

Formulation #2

Number of citations found=19

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{5}{5}$ (100% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{5}{19}$ (26% of retrieved documents are relevant)

Relevant citations:

EJ121660 EJ115861 EJ111820 EJ108055 ED099258

FEDERAL AID TO DAY CARE CENTERS

Search Topic #13: Federal aid to day care centers or services (including history, philosophy, arguments pro and con, experiences, funding, evaluation, parent involvement and attitudes. Only U.S. centers or services. (S AN=MO2)

Search Objective: The information seeker wants all information on this topic.

Step 3: Formulating Basic Search Logic--Planning Search Strategies

There are two facets of this topic: DAY CARE and FEDERAL AID. All formulations of this topic employ the building block approach to search strategy. All search terms representing DAY CARE are SELECTed and COMBINEd in an OR operation; likewise, terms representing FEDERAL AID are SELECTed and COMBINEd in an OR operation. Then, the results of the two subsearches are COMBINEd by the AND operator to produce the final set.

Step 4: Compiling the Search Terms

Both facets of the search are well represented by the controlled vocabulary of the ERIC Thesaurus. The searcher ought to consider displaying and selecting descriptors from the online thesaurus rather than keying each descriptor separately.

Step 5: Ordering Output

Since the information seeker wants all information on this topic, the searcher's pre-search preparation entails gathering all descriptors relevant to the topic and incorporating them into the formulation.

Step 6: Conceptualizing the Search as Input to the Retrieval System

In the Briefsearch, both facets of the topic are developed and input into the system in a single statement.

Briefsearch

```
1 SS (CHILD(W)CARE? OR DAY(W)CARE?) AND FEDERAL(W)AID
```

Formulation #2 involves the use of the rotated online thesaurus to display descriptors containing the descriptor Care. Descriptors are selected from the rotated display to represent the DAY CARE facet. In this way, the searcher does not have to type each term separately.

Formulation #2

```
? EZZ=CARE
Ref Items  Index-term
E1    140  ZZ=CARDS
E2      8  ZZ=CARDS// REPORT
E3    689 *ZZ=CARE
E4     42  ZZ=CARE CENTERS// DAY
E5      3  ZZ=CARE HOMES// PERSONAL
E6     20  ZZ=CARE OCCUPATIONS//
             CHILD
E7     39  ZZ=CARE SKILLS// SELF
E8      1  ZZ=CARE// AFTER SCHOOL
             DAY
E9     71  ZZ=CARE// CHILD
E10   133  ZZ=CARE// DAY
P                                -more-
Ref Items  Index-term
E11    29  ZZ=CARE// FAMILY DAY
E12    13  ZZ=CARE// PRIMARY HEALTH
E13    19  ZZ=CARE// RESIDENTIAL
E14     2  ZZ=CARE// RESPITE
E15  2202  ZZ=CAREER
                                 -more-
1  S  E4,E6,E8-E10
2  SS FEDERAL(W)AID AND S1
```

In the high recall formulation, search terms are SELECTed from all subject-rich fields, i.e. title, abstract, identifier, and descriptor.

Formulation #3

```
 1 SS CHILD(W)CARE? OR DAY(W)CARE?

 4 SS FEDERAL(W)AID OR FEDERAL(W)GRANT? OR FEDERAL(W)GOVERNMENT
 8 SS S7 OR FEDERAL(W)PROGRAM? OR NATIONAL(W)PROGRAM? OR
      GOVERNMENT(W)ROLE?

12 SS S11 OR FEDERAL(W)REGULATION? OR FEDERAL(1W)RELATIONSHIP?
      OR FEDERAL?(F)FINANC? OR FEDERAL?(F)SUPPORT?
17 C 16 AND 3
```

Step 8: Evaluating Final Results

The Briefsearch performs surprisingly well in terms of precision as over 90% of the output is relevant to the topic.

Briefsearch

Number of citations found=12

$$\text{Recall} = \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{11}{19}$$ (58% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{11}{12}\quad\text{(92\% of retrieved documents are relevant)}$$

The second formulation in which the online rotated display is accessed results in high recall and precision scores. Formulation #3 is the preferred approach as it retrieves all relevant information on the topic.

Formulation #2

Number of citations found=24

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{17}{19}\quad\text{(89\% relevant documents retrieved)}$$

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{17}{24}\quad\text{(71\% of retrieved documents are relevant)}$$

Formulation #3

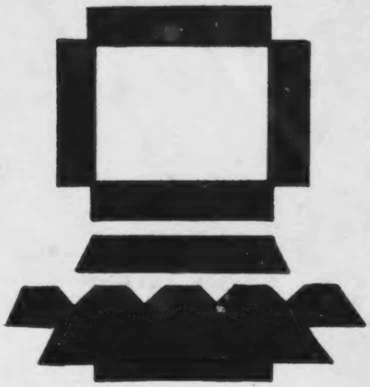
Number of citations found=43

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{19}{19}\quad\text{(100\% relevant documents retrieved)}$$

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{19}{43}\quad\text{(44\% of retrieved documents are relevant)}$$

Relevant citations:

EJ120117 EJ113000 EJ107771 ED110161 ED108742 ED105973 ED105962
ED103132 ED103121 ED103120 ED103119 ED103118 ED103091 ED101865
ED101839 ED097988 ED097098 ED097097 ED095622



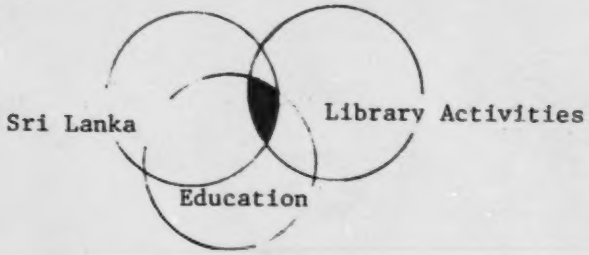
EDUCATION IN SRI LANKA

Search Topic #14: Education in Sri Lanka (including library activities). (S AN=S06)

Search Objective: The information seeker wants immediate results and you, the searcher, have no access to the ERIC Thesaurus or any other printed searching aids.

Step 3: Formulating Basic Search Logic--Planning Search Strategies

The topic is comprised of three facets, SRI LANKA, EDUCATION, and LIBRARY ACTIVITIES. Search terms representing EDUCATION and LIBRARY ACTIVITIES are joined together by the OR operator, then COMBINEd in an AND relationship with search terms representing the SRI LANKA facet. The shaded area of the diagram below shows the portion of the ERIC ONTAP database intended for retrieval.



A Briefsearch is planned before any lengthy preparation of search terms to represent the EDUCATION and LIBRARY ACTIVITIES facets, because the searcher is retrieving documents from an Education database. The most specific facet, SRI LANKA, is a likely starting place to find out how many (or how few) documents to expect in the final set, to gather additional terminology to represent the SRI LANKA facet, and to determine whether to apply the EDUCATION or LIBRARY ACTIVITIES facet.

Step 4: Compiling the Search Terms

In this instance, the searcher has no searching aids, particularly the ERIC Thesaurus, available. The obvious way of compiling search terms is to expand the identifier basic index under SRI LANKA, SELECT items from the display, then gather additional search terms by reading the full relevant documents or index records of relevant documents. This approach to search strategy is called citation pearl growing. If the final set contains too much non-relevant material, the searcher can always apply the EDUCATION or LIBRARY ACTIVITIES facets.

Step 5: Ordering Output

The information seeker wants immediate results. Since the searcher has no recourse to printed vocabulary or searching aids, he must use the online vocabulary aids of the retrieval system. If a high recall formulation is developed, the search terms used in the citation pearl growing approach can be re-entered into the system so that all subject-rich fields are searched.

Step 6: Conceptualizing the Search as Input to the Retrieval System

The citation pearl growing approach (Formulation #1) begins with the retrieval of the phrase Sri Lanka as a title word or identifier. The searcher prints the full records of two retrieved documents and finds that the term Ceylon occurs as an identifier in both documents. Ceylon is then incorporated into the search strategy. The search is terminated as the final set (five documents) is deemed too small to apply the EDUCATION or LIBRARY ACTIVITIES facets.

Formulation #1

```
? S SRI(W)LANKA/ID,TI

    1  5 SRI(W)LANKA/ID,TI

? T 1/5/1-2

1/5/1
EJ119755  IR502015
     TRENDS IN LIBRARIANSHIP AND DOCUMENTATION IN SRI LANKA
     SILVA, MANIL
     UNESCO BULLETIN FOR LIBRARIES, 29, 2   1975
     LANGUAGE:  ENGLISH
     DESCRIBES THE ACTIVITIES OF THE CEYLON NATIONAL LIBRARY SERVICES
BOARD, ESTABLISHED IN 1970, INCLUDING THE PILOT PROJECT IN SCHOOL AND
PUBLIC LIBRARIES, NATIONAL BIBLIOGRAPHY, NATIONAL LIBRARY, DOCUMENTATION
SERVICES, AND LIBRARY TRAINING.  (AUTHOR)
     DESCRIPTORS:        *LIBRARY    SERVICES/    *DOCUMENTATION/    PUBLIC
LIBRARIES/NATIONAL PROGRAMS/ LIBRARY EDUCATION/ PUBLISHING INDUSTRY
     IDENTIFIERS:  *SRI LANKA/ CEYLON

1/5/2
EJ111281  IR501378
     PROVISION OF PERIODICALS IN THE LIBRARIES OF SRI LANKA
     BANDARA, S. B.
     INTERNATIONAL LIBRARY REVIEW, 7, 1, 15-28  1975
     LANGUAGE:  ENGLISH
     A STUDY BASED ON THE PROBLEMS OF THE PERIODICALS DIVISION OF THE
LIBRARY OF THE PERADENIYA CAMPUS OF THE UNIVERSITY OF CEYLON.  (PF)
     DESCRIPTORS:        COLLEGE      LIBRARIES/      *FOREIGN      LANGUAGE
PERIODICALS/*PERIODICALS
     IDENTIFIERS:  PERADENIYA/ *SRI LANKA/ UNIVERSITY OF CEYLON
```

```
? SS CEYLON/ID,TI OR S1
     2  7  CEYLON/ID,TI
     3  9  CEYLON/ID, TI OR S1
```

The high recall formulation involves the search terms used in the citation pearl growing approach. Both terms are input as free text so all subject-rich fields are searched.

Formulation #2

1 SS CEYLON OR SRI(W)LANKA

Step 7: Evaluating Final Results

The first formulation in which the searcher has to rely on gathering terminology from actually searching the database results in better than average recall and precision scores. The recall and precision of both formulations are summarized below:

Formulation #1

Number of citations found=9

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{7}{12}$ (58% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{7}{9}$ (78% of retrieved documents are relevant)

Formulation #2

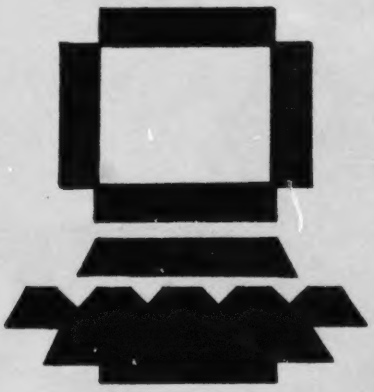
Number of citations found=14

Recall= $\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}$ $\frac{12}{12}$ (100% relevant documents retrieved)

Precision= $\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}$ $\frac{12}{14}$ (86% of retrieved documents are relevant)

Relevant citations:

EJ119755 EJ118646 EJ111281 EJ108704 ED107474 ED105946 ED104671
ED101444 ED098197 ED098108 ED096453 ED096416



AUDIOVISUAL AIDS FOR LIBRARY ORIENTATION

Search Topic #15: Audiovisual aids for orientation or
instruction of library users. (S AN=D02)

Step 3: Formulating Basic Search Logic--Planning Search Strategies

The search topic entails two facets: AUDIOVISUAL AIDS and LIBRARY INSTRUCTION. The high precision and high recall formulations employ the building block approach to search strategy in which search terms representing each facet are COMBINED separately in an OR operation. The results of these subsearches are then joined by the AND operator to create the final set.

Step 4: Compiling the Search Terms

This topic is cumbersome because of the many terms that are available to indicate the AUDIOVISUAL AIDS concept. The searcher may choose to use a Search Save to build the AUDIOVISUAL AIDS facet or prefer to select descriptors from the online thesaurus.

Step 5: Ordering Output

No output specifications are stated in the information need. Thus, Step 6 outlines three different search strategies to illustrate how each of these strategies achieves high recall, high precision, or low cost.

Step 6: Conceptualizing the Search as Input to the Retrieval System

The Briefsearch contains free text terms derived from descriptors with a large number of postings. The two facets are entered into the system with a single SuperSELECT command.

Briefsearch

```
1 SS LIBRARY(W)INSTRUCTION AND (MEDIA OR AUDIOVISUAL)
```

The high recall formulation incorporates the Search Save capability to retrieve documents on AUDIOVISUAL AIDS. The Search Save capability saves the searcher from inputting over 40 search terms.

Formulation #2

```
1  .EXECUTE__________(Search Save for Audiovisual Aids, see appendix)

2  SS LIBRARY(W)GUIDE? ? OR LIBRARY(W)INSTRUCTION
      OR LIBRARY(W)ORIENTATION OR LIBRARY(W)SKILLS
      OR LIBRARY(W)EDUCATION OR INFORMATION(W)RETRIEVAL

9  C 1 AND 8
```

Formulation #3 features the online thesaurus. Instead of typing in many terms to represent AUDIOVISUAL AIDS the searcher scans the 43 conceptually related terms and selects 40 of the displayed terms.

Formulation #2

```
? E(AUDIOVISUAL AIDS)
Ref Items  Index-term            Type RT
R1    493  AUDIOVISUAL AIDS  (NONPR
             INT INSTRUCTIONAL       45
R2         AUDIOVISUAL EQUIPMENT   U  1
R3         AUDIOVISUAL MATERIALS   U  1
R4         AUDIOVISUAL MEDIA       U  1
R5     63  INSTRUCTIONAL FILMS     N 10
R6     28  PROTOCOL MATERIALS      N 15
R7    614  EDUCATIONAL MEDIA       B 25
R8     32  AUDIO EQUIPMENT         R 22
R9     31  AUDIODISC RECORDINGS    R 12
R10        AUDIOTAPE RECORDERS     R  7
R11    83  AUDIOTAPE RECORDINGS    R 16
                                 -more-

? P
Ref Items  Index-term            Type RT
R12    38  AUDIOVISUAL CENTERS     R  8
R13    17  AUDIOVISUAL
             COMMUNICATIONS        R 11
R14     7  AUDIOVISUAL COORDINATORSR  7
R15   184  AUDIOVISUAL INSTRUCTION R 14
R16   104  AUTOINSTRUCTIONAL AIDS  R 15
R17     7  BULLETIN BOARDS         R  5
R18    29  CARTOONS                R 12
R19     5  CHALKBOARDS             R  5
R20     3  DISPLAY AIDS            R  9
R21    18  DOCUMENTARIES           R  9
R22    47  EDUCATIONAL EQUIPMENT   R 19
                                 -more-

? P
Ref Items  Index-term            Type RT
R23   372  EDUCATIONAL TECHNOLOGY  R 24
R24    32  ELECTROMECHANICAL AIDS  R 13
R25    88  ELECTRONIC EQUIPMENT    R 32
R26   182  FILMSTRIPS              R 13
R27  1919  INSTRUCTIONAL MATERIALS R 61
R28   161  LEARNING RESOURCES
             CENTERS               R 14
R29   328  MASS MEDIA              R 27
R30     3  MICROPHONES             R  3
R31     4  NONPRINT MEDIA          R 30
R32    26  PHOTOGRAPHIC EQUIPMENT  R 10
R33   171  PHOTOGRAPHS             R  8
                                 -more-
```

Comments

The searcher EXPANDs the descriptor Audiovisual Aids in the online thesaurus and scans three related term displays.

Formulation #2 (cont.) **Comments**

```
? P
Ref Items  Index-term              Type RT
R34    88  PROGRAMED INSTRUCTIONAL
             MATERIALS                R 14
R35    34  PROJECTION EQUIPMENT       R 18
R36     2  SCREENS (DISPLAYS)         R  5
R37    20  SENSORY AIDS               R 17
R38   150  SLIDES                     R  3
R39     4  TALKING BOOKS              R  9
R40     9  THREE DIMENSIONAL AIDS     R  6
R41    74  TRANSPARENCIES             R  6
R42    86  VIDEO EQUIPMENT            R 16
R43        VIDEODISC RECORDINGS       R  9
R44        VIDEOTAPE RECORDERS        R  7
P                                    -more-
?
  Ref Items  Index-term              Type RT
R45   194  VIDEOTAPE RECORDINGS       R 20
R46   123  VISUAL AIDS                R 34

? SR1,R5,R7-R13,R15-R27,R29-R46
     1 4108 R1,R5,R7-R13,R15-R27,R29-R46
                          R1:  AUDIOVISUAL
? SS LIBRARY INSTRUCTION AND S1
     2   45 LIBRARY INSTRUCTION (TRAINING
     3   10 2 AND 1
```

The searcher selects 40 of the 46 terms of the online thesaurus. Only one descriptor, Library Instruction, is used to represent the LIBRARY INSTRUCTION facet.

Step 7: Evaluating Final Results

The Briefsearch performed remarkably well in terms of recall and precision. Although it failed to retrieve two of the ten relevant documents, only three non-relevant documents were contained in the output.

Briefsearch

Number of citations found=11

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}}\quad\frac{8}{10}$$

(80% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}}\quad\frac{8}{11}$$

(73% of retrieved documents are relevant)

The high recall formulation achieved its objective but the output contained much non-relevant material. This can be explained by the use of the term Information Retrieval in the LIBRARY INSTRUCTION facet. Incorporated into the formulation to produce high recall, the term does not specifically refer to libraries.

Formulation #2

Number of citations found=57

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{10}{10}$$
(100% relevant documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{10}{57}$$
(18% of retrieved documents are relevant)

The high precision formulation requires a minimum of effort by the searcher. Selecting search terms to represent the AUDIOVISUAL AIDS facet is done quickly and efficiently through the use of the online thesaurus. The searcher relies on a single descriptor to indicate the LIBRARY INSTRUCTION facet. The high precision formulation also achieves high recall.

Formulation #3

Number of citations retrieved=10

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{8}{10}$$
(80% of documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{8}{10}$$
(80% of retrieved documents are relevant)

Relevant citations:

ED108712 ED108651 ED105882 ED102962 ED102961 ED101675 ED101662
ED100322 ED100315 ED098999

MANAGEMENT TRAINING

Search Topic #16: Training for Supervision and Management in Libraries and Information Centers (including need for training, descriptions of training programs or materials, training of students and professional working librarians; academic or on-the-job training. (S AN=D01)

Step 3: Formulating Basic Search Logic--Planning Search Strategies

There are three facets present in the search topic: TRAINING, MANAGEMENT, and LIBRARIES. Each facet is well covered in the controlled vocabulary of the ERIC database so that one can expect to find much information on every facet of the topic. The building block approach is the preferred strategy as it is likely that all three facets will be incorporated into the formulation.

Step 4: Compiling the Search Terms

It is difficult to express the three facets of the topic in ERIC's controlled vocabulary as pre-coordinated descriptors are available for representing TRAINING and MANAGEMENT (e.g., Management Training or Leadership Training), or for representing LIBRARIES and TRAINING (e.g., Library Education). In the Briefsearch and high recall search (Formulation #2), the three facets of the topic are evident in the formulation. When the controlled vocabulary is used to represent the TRAINING and MANAGEMENT facets (Formulation #3), these two facets are combined into one.

Step 5: Ordering Output

No output specifications are given by the information seeker.

Step 6: Conceptualizing the Search as Input to the Retrieval System

The Briefsearch incorporates free text search terms derived from descriptors with high postings. All three facets of the topic are present in the formulation.

Briefsearch

```
1 SS (LEADERSHIP OR MANAGEMENT) AND TRAINING AND LIBRAR?
```

Formulation #2 is constructed with the objective of achieving high recall. It is an example of the building block approach in which the facets are developed independent of one another, and their results combined in an AND operation. Search terms selected to represent the MANAGEMENT and TRAINING facets are derived from pre-coordinated descriptors embodying both facets. But these descriptors are broken down in the formulation and entered as free text terms in the appropriate facets. For example, the descriptor Management Training is entered as two free text terms, Manage? and Training, in the respective parts of the formulation which represent the MANAGEMENT and TRAINING facets.

Formulation #2

```
1  SS SUPERVIS? OR LEADERSHIP? OR
      PROFESSIONAL? ?  OR ADMINISTRAT?
      OR MANAGE?

7  SS INTERNSHIP? OR TEACHING OR
      TRAINING OR PREPARAT?
      OR PERFORMANC?

13 SS S12 OR LIBRARY(W)EDUCATION
      OR LEADERSHIP(W)EDUCATION
      OR SUPERVISOR(W)EDUCATION
      OR MANAGEMENT(W)EDUCATION
      OR PROFESSIONAL(W)EDUCATION
      OR ADMINISTRATOR(W)EDUCATION

20 SS LIBRAR? AND 6 AND 19
```

Comments

The five terms of SuperSELECT statement #1 make up the MANAGEMENT facet. Search terms of the TRAINING facet are entered in SuperSELECT statements 7 and 13. Education is not selected as a single free text term because of the risk of obtaining many false drops.

The online thesaurus is useful in this search topic to display and select terms representing the MANAGEMENT and TRAINING facets. Since descriptors selected from the online thesaurus indicate both facets, the formulation is characterized by two facets: LIBRARIES and MANAGEMENT TRAINING.

Formulation #3

```
? (E ADMINISTRATOR EDUCATION)
Ref Items  Index-term Type RT
R1    209  ADMINISTRATOR EDUCATION
              (PRESERVICE PROGR       9
R2         ADMINISTRATOR
             PREPARATION            U  1
R3         MANAGEMENT EDUCATION
             (1967 1980)            U  1
R4    311  PROFESSIONAL EDUCATION   B 36
R5     31  ADMINISTRATOR
             QUALIFICATIONS         R  8
R6      1  BUSINESS ADMINISTRATION
             EDUCATION              R  8
R7    124  MANAGEMENT DEVELOPMENT   R 16
                                   -more-
```

Comments

Formulation #3 (cont.) **Comments**

```
? P
Ref Items  Index-term              Type RT
R8     10  PUBLIC ADMINISTRATION
             EDUCATION                R 10
R9      2  SPECIALIST IN EDUCATION
             DEGREES                  R 10
R10     8  SUPERVISOR
             QUALIFICATIONS           R  6

1 S R1,R4,R7
```

The searcher SELECTs descriptors from two online thesaurus displays.

```
? E(LEADERSHIP TRAINING)
Ref Items  Index-term              Type RT
R1    106  LEADERSHIP TRAINING          11
R2   3726  TRAINING                 B 25
R3     16  BLACK LEADERSHIP         R  9
R4    307  LEADERS                  R 12
R5     19  LEADERS GUIDES           R  4
R6    566  LEADERSHIP               R 16
R7     44  LEADERSHIP QUALITIES     R  4
R8    124  MANAGEMENT DEVELOPMENT   R 16
R9     12  STUDENT LEADERSHIP       R  5
R10    54  SUPERVISORY TRAINING     R  8
R11    75  TRAINERS                 R  8
R12     7  YOUTH LEADERS            R  5

2 S R1,R8,R10
3 SS LIBRAR? AND (S1 or S2)
```

The results of the terms selected from the online thesaurus are COMBINEd with the LIBRARIES facet.

Step 7: Evaluating Final Results

The high recall formulation achieves 100% recall, but low precision; only one of every 10 retrieved citations is relevant to the search topic.

Formulation #2

Number of citations found=159

$$\text{Recall}= \frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{21}{21}$$

(100% relevant documents retrieved)

$$\text{Precision}= \frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{21}{159}$$

(13% of retrieved documents are relevant)

Formulation #3, which features the online thesaurus and controlled vocabulary, performs better with respect to recall than precision.

Formulation #3

Number of citations found=33

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{14}{21}$$

(67% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{14}{33}$$

(42% of retrieved documents are relevant)

The Briefsearch is a wise strategy to perform if a brief survey of the database is needed. Both Formulations #2 and #3 achieved higher recall and precision scores, respectively, but the Briefsearch aids the searcher to obtain an estimation of set size and gather searching vocabulary.

Briefsearch

Number of citations found=16

$$\text{Recall}=\frac{\text{Number of relevant citations found}}{\text{Number of citations in answer set}} \quad \frac{9}{21}$$

(43% relevant documents retrieved)

$$\text{Precision}=\frac{\text{Number of relevant citations found}}{\text{Number of citations found}} \quad \frac{9}{16}$$

(56% of retrieved documents are relevant)

Relevant citations:

EJ111362 ED110127 ED110004 ED109997 ED108694 ED107206 ED107205
ED107204 ED105875 ED105872 ED103011 ED102958 ED100392 ED100338
ED100315 ED098940 ED096994 ED096980 ED096966 ED096956 ED095910

APPENDIX

COMMON SEARCH FACETS/SEARCH SAVE FORMULATIONS

When searching the ERIC file, a number of concepts occur frequently as facets of search topics, such as:

1. Grade school level
2. Population groups
3. Types of libraries
4. Geographic areas
5. Miscellaneous topics

This appendix contains seven search formulations covering three of the five general areas listed above.* The formulations have been constructed according to the building block approach to search strategy; in almost every topic, a single concept is presented. Search logic is fairly simple; the concept, its variant forms, and synonymous terms are individually SELECTed and all results COMBINEd by the OR operator.** High recall is the primary objective.

Since search terms have been limited to those having postings, it is possible that some terms have been overlooked which may have postings in the future; the formulations can be modified to meet specific needs or used as given. It is suggested that searchers store any number of these searches by using the DIALOG Search Save feature which is illustrated below in a search for Junior High School (grades 7-9).

Sample Search Facet: Junior High School

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S GRADE 7 1157	GRADE 7.
2 S GRADE 8 1104	GRADE 8.

---

* All seven Search Saves in this section and the Search Save for WOMEN (Section II, Search topic #1) have been selected with permission from Selected Search Subroutines for Searching the ERIC Data Base with the Lockheed Information Retrieval Service, by Charles P. Bourne, Barbara Anderson and Jo Robinson. Berkeley, CA: Institute of Library Research, University of California, 1977. ED 140 870 (63p.)

**DIALOG's SuperSELECT feature is not used in Search Save formulations so that the index terms included in search terms can be presented clearly and easily.

Sample Search Facet (con't.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
3 S GRADE 9 1,145	GRADE 9.
4 S JUNIOR(W)HIGH 7,079	JUNIOR HIGH SCHOOL STUDENTS, JUNIOR HIGH SCHOOLS/ multi-term Junior High Identifier.
5 S MIDDLE(W)SCHOOL? 1,817	MIDDLE SCHOOLS.
6 C 1-5/OR 10,331	
? END/SAVE SERIAL#TOCM (T-ZERO-C-M) 21JUL81 14:15:50 User 4111 $0.00 0.052 Hrs File1* 6 Descriptors $0.42 Tymnet $0.42 Estimated Total Cost	After typing the search statements and COMBINing them in an OR relationship, the searcher types END/SAVE (or END/SAVE TEMP for a temporary Search Save) and concludes the Search Save. The routine is locked into the system when the system assigns a number to the strategy and prints it as part of its response to the END/SAVE command. In this sample case, serial number TOCM is assigned. To recall and process the strategy, the searcher types .EXECUTE TOCM or .EXECUTE STEPS TOCM (or TOCM).

Comments concerning the search formulations are given alongside the strategy as demonstrated above; also mentioned are descriptors (in CAPITAL letters) and identifiers included in the formulation according to the Thesaurus of ERIC Descriptors, (8th edition, 1980) and the Identifier Authority List, (March 1981). The approximate processing time and cost for EXECUTing a Search Save is given at the end of every formulation.

Portions of Search Saves can be executed using the EXECUTE STEPS command. In this way, separate sets for every search statement are created rather than a single set for the final statement of the Search Save. Using the above example, the following example demonstrates how the EXECUTE STEPS function is employed to perform statements 1 to 3 of the Search Save.

Sample Search Facet (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
.EXECUTE STEPS TOCM	In this example, only statements 1 to 3 are performed. If the command does not contain the last step number, e.g., .EXECUTE STEPS TOCM, the entire Search Save is performed and intermediary results obtained for every search statement.

At the conclusion of the EXECUTE STEPS command, information on date and cost is not given. The system's response looks the same as if the searcher had SELECTed the search phrases and terms manually.

Search Saves can be exchanged across DIALOG passwords.* A second user can execute the full Search Save on Junior High Schools in the following way:

```
.EXECUTE TOCM/USER 4111
```

If the second user wishes to have intermediary sets created from the exchanged Search Save, the Save is performed in the following way:

```
.EXECUTE STEPS TOCM/USER 4111 or .EXS TOCM/USER 4111
```

---

*For a more detailed description of exchanging Search Saves, see "What's New on the System?" Chronolog 6,2(Feb. 1978):4.

PRIMARY EDUCATION

Search Facet #1: Primary Education (grades K-3). All 11 search statements can be entered in a single SuperSELECT STEPS command (at maximum number of characters=240).

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S EARLY(W)CHILDHOOD 7,004	EARLY CHILDHOOD/ 7 multi-term Early Childhood Identifiers.
2 S GRADE(W)1 2,102	GRADE 1.
3 S GRADE(W)2 1,374	GRADE 2.
4 S GRADE(W)3 1,425	GRADE 3.
5 S KINDERGART? 5,564	KINDERGARTEN, KINDERGARTEN CHILDREN/ Kindergarten Enrichment Program, 7 other multi-term Kindergarten Identifiers.
6 S PRIMARY(W)EDUCATION 5,150	PRIMARY EDUCATION/ Primary Education Project, Primary Education Project (Britain).
7 S PRIMARY(W)GRADE? 1,017	
8 S PRIMARY(W)PROGRAM? 126	
9 S PRIMARY(W)SCHOOL? 1,184	/Primary Schools (United Kingdom).
10 S PRIMARY(W)SYSTEM? 31	
11 C 1-10/OR 19,395	

Approximate Processing Time: .130 hrs. ($3.25) in File 1 at 3-5 p.m., EST.

ELEMENTARY EDUCATION

Search Facet #2: Elementary Education (grades K-8). Requires two SuperSELECT STEPS search statements.

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S EARLY(W)CHILDHOOD 7,004	EARLY CHILDHOOD/ 7 multi-term Early Childhood Identifiers.
2 S ELEMENTARY(1W)EDUCATION 55,041	ELEMENTARY EDUCATION, ELEMENTARY SECONDARY EDUCATION/ Elementary Education Voucher Demonstration, 9 multi-term variations of Elementary Secondary Education Act, Elementary Secondary Education Amendments 1967.
3 S ELEMENTARY(W)GRADE? 901	
4 S ELEMENTARY(W)PROGRAM? 306	/Elementary Programs.
5 S ELEMENTARY(W)SCHOOL? 24,953	ELEMENTARY SCHOOLS, ELEMENTARY SCHOOL CURRICULUM, E.S. MATHEMATICS, E.S. SCIENCE, E.S. STUDENTS, E.S. TEACHERS/ Elementary School Counselor Questionnaire, 5 other multi-term Elementary School Identifiers.
6 S GRADE(W)1 2,102	GRADE 1.
7 S GRADE(W)2 1,374	GRADE 2.
8 S GRADE(W)3 1,425	GRADE 3.
9 S GRADE(W)4 1,518	GRADE 4.
10 S GRADE(W)5 1,620	GRADE 5.
11 S GRADE(W)6 1,777	GRADE 6.

Search Facet #2 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
12 S GRADE(W)7 1,311	GRADE 7.
13 S GRADE(W)8 1,223	GRADE 8.
14 INSTRUCTIONAL(W)GROUPING? 565	NONGRADED INSTRUCTIONAL GROUPING.
15 S INTERMEDIATE(W)GRADE? 2,051	INTERMEDIATE GRADES.
16 S INTERMEDIATE(W)SCHOOL? 183	/Intermediate School 201 NY.
17 S KINDERGART? 5,564	KINDERGARTEN, KINDERGARTEN CHILDREN/ Kindergarten Evaluation of Learning Potential, 7 other multi-term Kindergarten Identifiers.
18 S PRIMARY(W)EDUCATION 5,150	PRIMARY EDUCATION/ Primary Education Project, Primary Education Project (Britain).
19 S PRIMARY(W)GRADE? 1,017	
20 S PRIMARY(W)PROGRAM? 126	
21 S PRIMARY(W)SCHOOL? 1,184	/Primary Schools (United Kingdom).
22 S PRIMARY(W)SYSTEM? 312	
23 C 1-22/OR 86,359	

Approximate Processing Time: .207 hrs. ($5.18) in file 1 at 3-5 p.m., EST.

SECONDARY EDUCATION

Search Facet #3: Secondary Education (grades 9-12). Requires two SuperSELECT STEPS Search Statements.

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S COLLEGE(W)BOUND 984	COLLEGE BOUND STUDENTS/ College Bound Program.
2 S COLLEGE(W)PREPARATION 555	COLLEGE PREPARATION.
3 S GRADE 9 1,280	GRADE 9.
4 S GRADE 10 830	GRADE 10.
5 S GRADE 11 781	GRADE 11.
6 S GRADE 12 1,110	GRADE 12.
7 S HIGH(W)SCHOOL? 28,733	8 multi-term HIGH SCHOOL or HIGH SCHOOLS Descriptors, 2 multi-term JUNIOR HIGH SCHOOL Descriptors/ High School Awards Program, 11 other multi-term High School Identifiers, Junior High School Association of Illinois.
8 S PRECOLLEG? 172	/Precollege Educational Experience Programs.
9 S PRE(W)COLLEG? 227	
10 S PREPARATORY(W)SCHOOL? 59	

Search Facet #3 (cont).

FORMULATION	Comments and DESCRIPTORS/ Identifiers
11 S SECONDARY(W)EDUCATION 61,572	SECONDARY EDUCATION, ELEMENTARY SECONDARY EDUCATION/ Secondary Education Act 1967, Secondary Education Act (Yugoslavia 1970), Elementary Secondary Education Act, 8 other multi-term variations of Elementary Secondary Act, Elementary Secondary Education Amendments 1967.
12 S SECONDARY(W)GRADE? 305	
13 S SECONDARY(W)SCHOOL? 23,647	SECONDARY SCHOOLS, 5 multi-term SECONDARY SCHOOL Descriptors/ Secondary School Record.
14 C 1-13/OR 91,833	

Approximate Processing Time: .120 hrs. ($3.00) in file 1 at 3-5 p.m., EST.

CHILDREN

Search Facet #4: Children. Entire formulation of 11 terms requires one SuperSELECT search statement.

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S ADOLESCEN? 7,425	ADOLESCENT DEVELOPMENT, ADOLESCENT LITERATURE, ADOLESCENTS/ Adolescent Alienation Index, 3 other multi-term Adolescent or Adolescents Identifiers.
2 S BOY? ? 4,370	/Boy Girl Identity Task (Emmerich and Goldman), Boy Scouts of America, 2 multi-term Boys Identifiers.
3 S CHILD? 76,489	CHILD ABUSE, 17 other multi-term CHILD Descriptors, CHILDHOOD ATTITUDES, 3 other multi-term CHILDHOOD Descriptors, CHILDREN, 11 other multi-term CHILDREN Descriptors, CHILDRENS ART, CHILDRENS TELEVISION, CHILDRENS GAMES, CHILDRENS LITERATURE/ 36 multi-term Child Identifiers, Childhood and Government Project, 4 other Childhood Identifiers, Childless Families, 50 multi-term Childrens Identifiers, Childs (John), Childs View of Himself Scale.
4 S GIRL? 3,754	/3 multi Girl or Girls Identifiers.
5 S JUVENILE? 1,096	JUVENILE COURTS, JUVENILE GANGS/ Juvenile Achievement Center TX, 6 other multi-term Juvenile Identifiers.
6 S TEEN(W)AGE 110	/Teen Age Medical Service.
7 S TEENAGE? 992	/Teenage Opportunity Programs.

Search Facet #4 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
8 S YOUTH? 15,299	YOUTH, 15 multi-term YOUTH Descriptors/ Youth Act 1980, 29 other multi-term Youth Identifiers.
9 C 1-8/OR 87,289	

Approximate Processing Time: .041 hrs. ($0.75) in file 1 at 3-5 p.m., EST.

If the search were to include very young children, you might want to add the following terms after the search save is EXECUTEd:

FORMULATION	Comments and DESCRIPTORS/ Identifiers
10 S BABY 344	/Baby Talk.
11 S BABIES 180	
12 S INFAN? 3,866	INFANT BEHAVIOR, INFANT MORTALITY, INFANTS, PREMATURE INFANTS/ Infant Care, 15 other multi-term Infant Identifiers, Infantile Amnesia.
13 S TODDLER? 257	/Toddlers.
14 S YOUNGSTER? 718	
15 C 1-14/OR 91,861	

Approximate Processing Time for Search Save Plus Additional Terms:
.053 hrs. ($1.33) in file 1 at 3-5 p.m., EST

AMERICAN INDIANS

Search Facet #5: American Indians (general search). If the objective is a high recall search, then consideration should be given to formulating a Search Save which would include many specific tribal names. This routine is comprised of general terms applied to the large population group of American Indians and does not include tribal names. Requires one SuperSELECT STEPS search statement.

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S ALASKA?(W)NATIVE? 401	ALASKA NATIVES/ Alaska Native Core Program, Alaska Native Language Center.
2 S AMERINDIAN? 3	/Amerindians.
3 S AMERICAN(W)INDIANS? 6,162	AMERICAN INDIAN CULTURE, 5 multi-term AMERICAN INDIAN Descriptors, AMERICAN INDIANS, 4 multi-term AMERICAN INDIANS Descriptors/ American Indian Administrator Training Program, 14 other multi-term American Indian Identifiers, American Indians Into Medicine Program.
4 S NATIVE(W)AMERICAN? 83	/Native American Administrator Program, Native Americans.
5 S RESERVATION?(F)INDIAN? 778	RESERVATION AMERICAN INDIANS, AMERICAN INDIAN RESERVATIONS.
6 S TRIBAL 201	/Tribal Government, 2 other multi-term Tribal Identifiers.
7 S TRIBE? 1,533	TRIBES.
8 S TRIBALLY 23	/Tribally Controlled Education, 1 other multi-term Tribally Identifier.
9 C 1-8/OR 6,397	

Approximate Processing Time: .031 hours ($0.78) in file 1 at 3-5 p.m., EST.

AUDIOVISUAL AIDS

Search Facet #6: Audiovisual Aids. Requires four SuperSELECT STEPS search statements.

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S AUDIO(W)VIDEO 54	/Audio Video Data Signals, Audio Video Recording.
2 S AUDIOVIDEO? 6	
3 S AUDIO(W)VISUAL? 1,311	/Audio Visual Activities Commission, 4 other multi-term Audio Visual Identifiers.
4 S AUDIOVISUAL? 9,093	AUDIOVISUAL AIDS, 4 multi-term AUDIOVISUAL Descriptors/ Audiovisual Contracting, Audiovisual Manipulative Desk.
5 S AUTOINSTRUCTIONAL(W)AID? 1,201	AUTOINSTRUCTIONAL AIDS/ Speech Autoinstructional Device.
6 S AV 1,246	The truncation capability is not used in this search statement because terms such as avenue, aviation, average, or avocation would be retrieved; included Identifier: AV Communication Review.
7 S CARTOON? 594	CARTOONS.
8 S CARTRIDG? 99	
9 S CASSETTE? 1,147	3 multi-term CASSETTE or CASSETTES Descriptors/ Cassette Review Program, Cassette Sound Filmstrip Viewers.
10 S COLOR(W)PRESENTATION? 6	
11 S DIAL(W)ACCESS 172	DIAL ACCESS INFORMATION SYSTEMS.

Search Facet #6 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
12 S DOCUMENTAR? 440	DOCUMENTARIES.
13 EDUCATIONAL(W)MEDIA 6,086	EDUCATIONAL MEDIA/ Educational Media Council NY, 2 other multi-term Educational Media Identifiers.
14 S EXHIBIT? 2,669	EXHIBITS.
15 S EXPOSITION? 249	
16 S FILM? 9,130	FILMS, 7 multi-term FILM Descriptors, FILMOGRAPHIES, 3 multi-term FILMS Descriptors, FILMSTRIP PROJECTORS, FILMSTRIPS/ Film Aesthetics, 12 other multi-term Film Identifiers, Filmic Styles, Films Incorporated, FILMS NY.
17 S GRAPHIC(W)AID? 22	
18 S GRAPHIC(W)ART? 651	GRAPHIC ARTS/ Graphic Arts Industries.
19 S GRAPHICS 787	COMPUTER GRAPHICS, ENGINEERING GRAPHICS/ Graphics Expression Reading Improvement System.
20 S INSTRUCTIONAL(W)AID? 578	
21 S INSTRUCTIONAL(W)MEDIA 616	
22 S LANGUAGE(W)AID? 133	
23 S LANGUAGE(W)LAB? 1,166	LANGUAGE LABORATORIES/ Language Laboratory Monitoring.
24 S LEARNING(W)LAB? 1.099	LEARNING LABORATORIES.

Search Facet #6 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
25 S MEDIA 17,494	
26 S MICROPHONE? 92	MICROPHONES.
27 S MULTI(W)MEDIA 627	Multi Media Treatise on Nuclear War and Peace.
28 S MULTIMEDIA 218	MULTIMEDIA INSTRUCTION/ Multimedia Reviews Index.
29 S NONPRINT(W)MEDIA 193	NONPRINT MEDIA.
30 S OVERHEAD(W)PROJECTOR? 378	OVERHEAD PROJECTORS.
31 S PHONODISC? 17	
32 S PHONOGRAPH? 96	/Phonographs.
33 S PHONOTAPE? 8	
34 S PHOTOGRAPH? 3,393	PHOTOGRAPHIC EQUIPMENT, PHOTOGRAPHS, PHOTOGRAPHY/ Photograph Finishers, 5 multi-term Photographic Identifiers.
35 S POSTER? 437	/Posters.
36 S PROJECTION(W)EQUIPMENT 332	PROJECTION EQUIPMENT.
37 S RADIO? ? 2,938	RADIO, EDUCATIONAL RADIO, TELEVISION RADIO REPAIRERS/ Radio Japan, 9 other multi-term Radio Identifiers.
38 S REALIA? 96	REALIA.

Search Facet #6 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
39 S SCREENS (DISPLAYS) 35	SCREENS (DISPLAYS).
40 S SLIDE(W)PROJECTOR? 64	
41 S SLIDE(W)TAPE? 298	
42 S SLIDES 1,500	SLIDES/ Slides Test.
43 S TAPE(W)RECORD? 2,521	TAPE RECORDERS, TAPE RECORDINGS.
44 S TELEVISION? 10,629	TELEVISION, 16 multi-term TELEVISION Descriptors/ Television Access, 9 other multi-term Television Identifiers.
45 S TRANSPARENC? 1,356	TRANSPARENCIES.
46 S TV 1,604	/TV Phone.
47 S VIDEO? 4,878	VIDEO EQUIPMENT, 4 multi-term VIDEO Descriptors/ Video Articulator, 7 other multi-term Video Identifiers, Videodiscs, Videographics Systems, Videopublishing, Videosonic Opticon Application, Videosonic Teaching Machine, Videotape Participation System, Videotape Program Service, Videotex, Videotext, 2 multi-term Audio Video Identifiers.
48 S VIEWER? 632	
49 S VISUAL(W)AID? 1,656	VISUAL AIDS.
50 S VISUALS 304	

Search Facet #6 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
51 C 1-25/OR	
52 C 26-51/OR 51,123	

Approximate Processing Time: .156 hours. ($3.90) in file 1 at 3-5 p.m., EST.

EVALUATION (HIGH RECALL)

Search Facet #7: Evaluation. This is a high recall search for the concept of Evaluation. Full use of free text searching and truncation is made; over 150,000 postings are retrieved when processing this search in DIALOG's full ERIC. Search Save #8, on the other hand, is a high precision formulation for Evaluation.

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S ANALY? 80,220	34 Multi-term ANALYSIS Descriptors, ANALYSTS, ANALYTIC GEOMETRY, ANALYTICAL CRITICISM /Analysis of Concepts by Data Processing, 4 multi-term Analysis Identifiers, Analytical Methods, 6 other multi-term Analytical Identifiers, Behavior Analysis Classroom.
2 S APPRAIS? 2,316	PROPERTY APPRAISAL.
3 S ASSESS? 32,266	ASSESSED VALUATION, EDUCATIONAL ASSESSMENT, INFORMAL ASSESSMENT, NEEDS ASSESSMENT, PERSONALITY ASSESSMENT/ Assessing the Behaviors of Caregivers Scale, Assessment, 11 other multi-term Assessment Identifiers.
4 S COMPAR? 38,145	COMPARATIVE ANALYSIS, COMPARATIVE EDUCATION, COMPARATIVE TESTING, EDUCATIONAL STATUS COMPARISON/ Comparability, Comparable Cost Information, 15 multi-term Comparative Identifiers, Compartment Flow Model Simulation Program.
5 S COST? ? 16,581	COST EFFECTIVENESS, COST INDEXES, COSTS, 7 multi-term COSTS Descriptors/ Cost Accounting, 6 other multi-term Cost Identifiers, Costs of Schools Training and Education.

Search Facet #7 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
6 S CRITER? 21,055	CRITERIA, 3 multi-term CRITERIA Descriptors, CRITERION REFERENCED TESTS/ Criteria of Success in English Test (Dixon), 4 multi-term Criterion Identifiers.
7 S EFFECT? 70,641	PRIMACY EFFECT, COST EFFECTIVENESS, 4 multi-term EFFECTIVENESS Descriptors, 3 multi-term EFFECTS Descriptors/ Effectance Motivation, Effect Size, Effective Listening, 3 other multi-term Effective Identifiers, Effectively Influencing Political Decisions, Effectiveness Motivation Scale (Stott and Sharp).
8 S EVALUAT? 81,076	EVALUATION, ADMINISTRATOR EVALUATION, 29 other multi-term EVALUATION Descriptors, EVALUATORS, EVALUATIVE THINKING/ Evaluation and Prevocational Conditioning Course, 9 other multi-term Evaluation Identifiers, 6 multi-term Evaluative Identifiers, Evaluators.
9 S FEASIB? 3,521	FEASIBILITY STUDIES.
10 S IMPACT? 11,386	/Impact, 6 other multi-term Impact Identifiers.
11 S MEASUR? 38,258	MEASUREMENT, 7 multi-term MEASUREMENT Descriptors, AFFECTIVE MEASURES, 7 multi-term MEASURES Descriptors/ 5 multi-term Measurement Identifiers, Measures of Association, Measures of Musical Abilities.

Search Facet #7 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
12 S PERFORMANCE? 30,508	PERFORMANCE, 7 multi-term PERFORMANCE Descriptors/ Performance Appraisal, 12 other multi-term Performance Identifiers.
13 S RELIAB? 7,159	RELIABILITY, TEST RELIABILITY/ Reliability Analysis Center, Reliability Formulas.
14 S SUCCESS? ? 11,445	SUCCESS, FEAR OF SUCCESS.
15 S SUCCESSFUL 11,445	
16 S VALID? 13,068	VALIDATED PROGRAMS, PROGRAM VALIDATION, VALIDITY, PREDICTIVE VALIDITY, TEST VALIDITY/ Validity Research.
17 C 1-16/OR 235,544	

Approximate Processing Time: .077 hrs. ($1.93) in file 1 at 3-5 p.m., EST.

EVALUATION (HIGH PRECISION)

Search Facet #8: Evaluation. This is a high precision search formulation for the concept of Evaluation. It is restricted to searching only the identifier, title, and descriptor fields of the ERIC record. Truncation is not used at all in this formulation in order to eliminate the possibility of retrieving false drops. Because this search omits the abstract, which is the most general of the four subject-conveying fields in the ERIC record, the result of Search Save #8 is a little more than half the size of the final set in #7. Requires two SuperSELECT Steps statements.

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S ANALYS?S/DE,ID,TI 46,022	ANALYSTS, 34 multi-term ANALYSIS Descriptors/ Analysis of Concepts by Data Processing, Behavior Analysis Classroom.
2 S ANALYTIC/DE,ID,TI 440	ANALYTIC GEOMETRY/ Analytic Philosophy, 3 other multi-term Analytic Identifiers.
3 S APPRAIS?/DE,ID,TI 706	PROPERTY APPRAISAL.
4 S ASSESS?/DE,ID,TI 13,757	ASSESSED VALUATION, EDUCATIONAL ASSESSMENT, 2 multi-term ASSESSMENT Descriptors/ Assessing the Behaviors of Caregivers Scale, Assessment, 11 other multi-term Assessment Identifiers.
5 S COMPAR?/DE,ID,TI 18,335	4 multi-term COMPARATIVE Descriptors, EDUCATIONAL STATUS COMPARISON/ 15 multi-term Comparative Identifiers, Comparability, Comparable Cost Information, Compartment Flow Model Simulation Program.
6 S COST? ?/DE,ID,TI 9,412	COST EFFECTIVENESS, 2 multi-term COST Descriptors, COSTS, 7 multi-term COSTS Descriptors/ Cost Plus Pricing, 6 other multi-term Cost Identifiers, Costs of Schools Training and Education.

Search Facet #8 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
7 S CRITERI?/DE,ID,TI 12,336	CRITERIA, 3 multi-term CRITERIA Descriptors, CRITERION REFERENCED TESTS/Criteria of Success in English Test (Dixon), Criterion Group Method, 3 other multi-term Criterion Identifiers.
8 S EFFECTIVE?/DE,ID,TI 20,152	5 multi-term EFFECTIVENESS Descriptors/ Effective Listening, 3 other multi-term Effective Identifiers, 1 Effectively Identifier, 1 Effectiveness Identifier.
9 S EVALUATION/DE,ID,TI 55,567	EVALUATION, 29 multi-term EVALUATION Descriptors/ 10 multi-term Evaluation Identifiers.
10 S EVALUATIVE/DE,ID,TI 823	EVALUATIVE THINKING/ 6 multi-term Evaluative Identifiers.
11 S FEASIBILITY/DE,ID,TI 1,082	FEASIBILITY STUDIES.
12 S IMPACT/DE,ID,TI 2,567	
13 S MEASUREMENT/DE,ID,TI 12,623	MEASUREMENT, 6 multi-term MEASUREMENT Descriptors/ 5 multi-term Measurement Identifiers.
14 S PERFORMANCE/DE,ID,TI 16,015	PERFORMANCE, 7 multi-term PERFORMANCE Descriptors/ 13 multi-term Performance Identifiers.
15 S RELIABILITY/DE,ID,TI 4,344	RELIABILITY, TEST RELIABILITY/ Reliability Analysis Center, Reliability Formulas.
16 S SUCCESSFUL/DE,ID,TI 601	

Search Facet #8 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
17 S VALID?/DE,ID,TI 8,125	VALIDITY, PREDICTIVE VALIDITY, TEST VALIDITY/ Validity Research.
18 C 1-17/OR 142,769	

Approximate Processing Time: .056 hrs. ($1.40) in file 1 at 3-5 p.m., EST.

HANDICAPPED

Search Facet #9: Mentally, Neurologically, and Emotionally Handicapped.

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S ANTISOCIAL(W)BEHAVIOR 1,132	ANTISOCIAL BEHAVIOR.
2 S APHASI? 272	APHASIA.
3 S AUTISM 529	AUTISM.
4 S BRAIN(W)DAMAGE? 237	
5 S BRAIN(W)DYSFUNCTION 383	MINIMAL BRAIN DYSFUNCTION.
6 S BRAIN(W)INJUR? 128	
7 S CEREBRAL(W)PALSY 296	CEREBRAL PALSY.
8 S DEPRESSION (PSYCHOLOGY) 236	DEPRESSION (PSYCHOLOGY).
9 S DEVELOPMENTAL(W)DISABILIT? 443	DEVELOPMENTAL DISABILITIES.
10 S DEVIANT(W)BEHAVIOR 137	
11 S DOWNS(W)SYNDROME 277	DOWNS SYNDROME.
12 S DYSLEX? 395	DYSLEXIA.
13 S EPILEPSY 146	EPILEPSY/ Epilepsy Foundation of America.

Search Facet #9 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
14 S HANDICAP? 16,321	HANDICAP IDENTIFICATION, 3 multi-term HANDICAPPED Descriptors, 3 multi-term HANDICAPS Descriptors/ Handicap Problems Inventory, 2 multi-term Handicapped Identifiers.
15 S HYPERACTIV? 668	HYPERACTIVITY.
16 S MALADJUSTED(W)CHILD? 46	
17 S MONGOLISM 27	MONGOLISM.
18 S MONGOLOID? 45	
19 S NEUROS?S 205	NEUROSIS.
20 S NEUROTIC? 277	/Neuroticism Scale Questionnaire.
21 S PARANOID(W)BEHAVIOR 21	PARANOID BEHAVIOR.
22 S PROBLEM(W)CHILD? 428	PROBLEM CHILDREN.
23 S PSYCHOS?S 241	PSYCHOSIS.
24 S PSYCHOSOMATIC(W)DISORDER? 62	PSYCHOSOMATIC DISORDERS.
25 S PSYCHOTIC? 166	/Psychotic Inpatient Profile.
26 S RETARDATION 8,027	4 multi-term RETARDATION Descriptors.
27 S SCHIZOPHRENI? 506	SCHIZOPHRENIA.

Search Facet #9 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
28 S STUDENT(W)ADJUSTMENT? 670	STUDENT ADJUSTMENT.
29 C 1-28/OR 26,081	
30 S BEHAVIOR 49,022	BEHAVIOR PROBLEMS/ Behavior Problem Checklist.
31 S EMOTIONAL? 8,451	EMOTIONAL DISTURBANCES, EMOTIONAL PROBLEMS.
32 S LEARNING 72,760	LEARNING PROBLEMS, LEARNING DISABILITIES.
33 S MENTAL? 14,884	MENTAL DISORDERS.
34 S NEUROLOGICAL? 1,268	NEUROLOGICAL IMPAIRMENTS.
35 S PERCEPTUAL? 4,297	PERCEPTUAL HANDICAPS.
36 S PERSONALITY 8,714	PERSONALITY PROBLEMS.
37 C 30-36/OR 129,542	
38 S DEFECT? 532	
39 S DEFICIEN? 2,267	
40 S DISABILIT? 10,265	
41 S DISORDER? 2,293	
42 S DISTURB? 3,517	
43 S HANDICAP? 16,321	

Search Facet #9 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
44 S ILL 709	
45 S ILLNESS? 714	
46 S IMPAIRMENT? 5,233	
47 S PROBLEM? 72,789	
48 C 38-47/OR 96,575	
49 C 37 AND 48 37,037	
50 C 29 OR 49 50,840	

Approximate Processing Time: .127 hrs. ($3.18) in file 1 at 3-5 p.m., EST.

PRESCHOOL

Search Facet #10: Preschool.

FORMULATION	Comments and DESCRIPTORS/ Identifiers
1 S EARLY(W)CHILDHOOD 7,004	EARLY CHILDHOOD/Early Childhood Assessment Battery, 6 other multi-term Early Childhood Identifiers.
2 S KINDERGART? 5,564	KINDERGARTEN, KINDERGARTEN CHILDREN/ Kindergarten Experience Comparison, 7 other multi-term Kindergarten Identifiers.
3 S NURSERY(W)SCHOOL? 920	NURSERY SCHOOLS.
4 S PREKINDERGART? 274	
5 S PRE(W)KINDERGART? 143	
6 S PRE(W)PRIMARY 48	
7 S PREPRIMARY 91	
8 S PRE(W)SCHOOL 687	
9 S PRESCHOOL? 10,594	PRESCHOOL CHILDREN, 5 multi-term PRESCHOOL Descriptors/ Preschool Abilities Test, 20 other multi-term Preschool Identifiers, Montessori Preschools.
10 C 1-9/OR 19,467	

Approximate Processing Time: .057 hrs. ($1.43) in file 1 at 3-5 p.m., EST.

The above formulation is rather specific to the preschool age group. If a high recall search is desired, consideration might be given to adding the following two terms which include the preschool age group, but also include other groups.

Search Facet #10 (cont.)

FORMULATION	Comments and DESCRIPTORS/ Identifiers
11 S CHILD(W)CARE? 2,438	/Child Care Act 1979.
12 S DAY(W)CARE? 2,557	ADULT DAY CARE, AFTER SCHOOL DAY CARE, DAY CARE, FAMILY DAY CARE/ Day Care Environmental Inventory, Day Care Licensing.
13 C 1-12/OR 21,591	

Approximate Processing Time: .090 hrs. ($2.25) in file 1 at 3-5 p.m., EST.

APPENDIX

GUIDE TO DIALOG'S ERIC DATA BASE

The database description for ERIC (File 1) prepared by DIALOG for their volume entitled, Guide to DIALOG--Databases (Palo Alto, CA: Lockheed Information Systems, August 1977), and revised in April 1981, is reproduced here almost in its entirety (only a few pages of search examples are omitted). The DIALOG "Blue Sheets" for both ERIC (File 1) and ERIC ONTAP (File 201) are also provided.

These descriptions should be of assistance to the reader of this manual as they provide the most definitive expositions of the ERIC files (RIE and CIJE) as they appear and are accessed on the DIALOG Information Retrieval Service.

ERIC

DIALOG INFORMATION RETRIEVAL SERVICE

FILE DESCRIPTION

ERIC is the complete database of educational materials collected by the Educational Resources Information Center. It consists of two subfiles: *Resources in Education* (RIE), which is concerned with the most significant and timely education research reports; and *Current Index to Journals in Education* (CIJE), an index to more than 700 periodicals of interest to every segment of the educational profession.

SUBJECT COVERAGE

The ERIC database includes a wide variety of educational information organized by the following broad subject areas:

- Adult, Career, and Vocational Education
- Counseling and Personnel Services
- Early Childhood Education
- Educational Management
- Handicapped and Gifted Children
- Higher Education
- Information Resources
- Junior Colleges
- Languages and Linguistics
- Reading and Communication Skills
- Rural Education and Small Schools
- Science, Mathematics, and Environmental Education
- Social Studies/Social Science Education
- Teacher Education
- Tests, Measurement, and Evaluation
- Urban Education

SOURCES

ERIC collects and indexes many document types: research reports, evaluation studies, curriculum guides, lesson plans, bibliographies, course descriptions, theses, journal articles, pamphlets, and other "fugitive" materials. All non-copyrighted items can be purchased from the ERIC Document Reproduction Service (EDRS) in paper copy or microfiche. There are approximately 650 locations throughout the country having collections of the ERIC microfiche, and most are open to the general public.

DIALOG FILE DATA

Inclusive Dates:	1966 to the present
Update Frequency:	Monthly (approximately 3,000 records per month)
File Size:	402,262 records as of September 1980

ORIGIN

ERIC is produced by:

National Institute of Education
Educational Resources Information Center
Washington, DC 20208

Questions concerning file content should be directed to:

ERIC Processing and Reference Facility
4833 Rugby Avenue, Suite 303
Bethesda, MD 20014

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No special terms or conditions.

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(Revised December 1980)

ERIC
DIALOG FILE 1

SAMPLE RECORD

```
DIALOG Accession Number
     ED178312  SE029137
CH=    Guidelines for Teaching Mathematics K-12.
AU=  Flax, Rosabel; And Others
CS=  Kansas State Dept. of Education, Topeka. Div. of Education Services.
PY=    Jun 1979   91p.; Best copy available
       EDRS Price - MF01/PC04 Plus Postage.
LA=  Language: English
DT=  Document Type: Teaching Guide (052)
CP=  Geographic Source: U.S./ Kansas
JA=  Journal Announcement: RIEMAR80
GL=  Government: State
       This  guide  is  intended  to  provide  a  basic  outline for developing local   }
     mathematics programs.  It was developed to give Kansas mathematics teachers from   }
     grades  K-12 minimal sequential experiences in implementing the skills,  values,   }
     and concepts of the mathematics program.  The  guide  contains  objectives,   a    } /AB
     checklist  of  topics  appropriate  for each grade level,  and a human resources   }
     guide which provides the names of individuals  willing  to  serve  as  technical   }
     assistants to local school districts. (MK)                                          }
       Descriptors:   *Directories/  *Elementary  School  Mathematics/  Elementary       }
     Secondary Education/  Guidelines/  *Mathematics Curriculum/  *Resource Teachers/   } /DE
     *Secondary  School Mathematics/  *State Curriculum Guides/  State Departments of   }
     Education                                                                           }
       Identifiers: *Kansas                                                              /ID
```

SEARCH OPTIONS

BASIC INDEX

SUFFIX	FIELD NAME	EXAMPLES	
None	Basic Index (Includes Abstract, Descriptor Identifier, and Title)	E SKILLS	S RESOURCE?
/AB	Abstract	S MATHEMATICS(W)PROGRAM?/AB	
/DE	Descriptor[1]	S MATHEMATICS CURRICULUM/DE	
/ID	Identifier[2]	S KANSAS/ID	
/TI	Title	S TEACHING(F)GUIDELINES/TI	

[1] Also /DE*, /DF, /DF*.
[2] Also /ID*, /IF, /IF*.

ADDITIONAL INDEXES

PREFIX	FIELD NAME	EXAMPLES	
AN=	Clearinghouse Number	E AN=VT203158	S AN=SE029137
AU=	Author	E AU=BOOKER, E	S AU=FLAX, R?
CH=	Clearinghouse Code	E CH=VT	S CH=SE
CN=	Contract/Grant Number[3]	E CN=NIDA	S CN=NIDA-5-H81-DA-01496-03
CP=	Country of Publication[3,4]	E CP=JAPAN	S CP=U.S.
CS=	Corporate Source[3]	E CS=BBB10844	S CS=KANSAS(F)CS=STATE(F)CS=EDUCATION
DT=	Document Type[3]	E DT=TEACHING GUIDE	S DT=052
GL=	Government Level[3,4]	E GL=FOREIGN	S GL=STATE
JA=	Journal Announcement	E JA=CIJMAY80	S JA=RIEMAR80
JN=	Journal Name	E JN=LIBRARY	S JN=READING HORIZONS
LA=	Language[4]	E LA=FRENCH	S LA=GERMAN
PN=	Bureau/Project Number[3]	E PN=BR	S PN=BR-7-0883
PY=	Publication Year	E PY=1964	S PY=1979
RN=	Report Number[3]	E RN=ADM	S RN=ADM-79-678
SP=	Sponsoring Agency[3]	E SP=INST	S SP=BABCOCK(W)SP=FOUNDATION
UD=	Update	E UD=8003	S UD=9999
ZZ=	Rotated Descriptors	E ZZ=ABILITY	(Select from EXPAND display)

[3] RIE records only.
[4] For records from 1979 to the present.

LIMITING

SUFFIX	FIELD NAME	EXAMPLES	
/ED	Accession Numbers and/or RIE Subfile	LIMIT 1/080788-999999/ED	LIMIT 4/ED
/EJ	Accession Numbers and/or CIJE Subfile	LIMIT 5/082165-999999/EJ	LIMIT 8/EJ
/AVAIL	Document Available from EDRS	LIMIT 6/AVAIL	
/UNAVAIL	Document Not Available from EDRS	LIMIT 14/UNAVAIL	
/MAJ	Major Descriptor or Identifier	LIMIT 7/MAJ	
/MIN	Minor Descriptor or Identifier	LIMIT 9/MIN	

SORTING

SORTABLE FIELDS	EXAMPLES
Online (.SORT) and offline (PRINT). AU,CS,JN,PY,TI	.SORT 8/1-56/JN/PY PRINT 15/5/1-129/AU

FORMAT OPTIONS

NUMBER	RECORD CONTENT	NUMBER	RECORD CONTENT
Format 1	DIALOG Accession Number	Format 5	Full Record
Format 2	Full Record except Abstract	Format 6	Title and DIALOG Accession Number
Format 3	Bibliographic Citation	Format 7	Bibliographic Citation and Abstract
Format 4	Abstract and Title	Format 8	Title and Indexing

DIRECT RECORD ACCESS

PREFIX	FIELD NAME	EXAMPLES	
None	DIALOG Accession Number	TYPE ED178312/6	PRINT EJ207531/5

ONTAP® ERIC

DIALOG INFORMATION RETRIEVAL SERVICE

FILE DESCRIPTION

The ONTAP ERIC file is designed for ONline Training And Practice. The file includes one year (1975) of the ERIC (File 1) records. The corresponding printed versions of ONTAP ERIC are the 1975 issues of *Resources in Education (RIE)* and *Current Index to Journals in Education (CIJE).*

SUBJECT COVERAGE

The subject coverage of the ONTAP ERIC database is the same as for the ERIC file:

- Career Education
- Counseling and Personnel Services
- Early Childhood Education
- Educational Management
- Handicapped and Gifted Children
- Higher Education
- Information Resources
- Junior Colleges
- Languages and Linguistics
- Reading and Communication Skills
- Rural Education and Small Schools
- Science, Mathematics, and Environmental Education
- Social Studies/Social Science Education
- Teacher Education
- Tests, Measurement, and Evaluation
- Urban Education

SPECIAL FEATURES

The ONTAP ERIC file provides test questions and relevant records in answer sets for each test question. The 1975 ERIC file is the source of the answer sets. There are 27 test questions at three levels of complexity: simple, medium, and difficult.

Search results on any of the test questions can be compared with thoroughly developed answer sets, giving immediate feedback on the search strategy employed, checking records for leads on additional terms, etc., comparison of effectiveness in searching title vs. descriptor fields, etc. Searchers can also score their results by having the DIALOG system calculate the precision and recall scores of their search.

All DIALOG system features may be used **except** the Search•Save® and the offline PRINT commands.

DIALOG FILE DATA

Inclusive Dates:	January 1, 1975 to December 31, 1975
Update Frequency:	Not applicable - Special file
File Size:	32,120 records

ORIGIN

The ONTAP ERIC file is provided by the DIALOG Information Retrieval Service for training and practice. Questions concerning this file should be directed to:

DIALOG Customer Services
DIALOG Information Retrieval Service
3460 Hillview Avenue
Palo Alto, CA 94304

Telephone: 800/227-1960 (outside California)
800/982-5838 (inside California)
415/858-2700
TELEX: 334499 (DIALOG)

No special terms or conditions.

DIALOG is a Trademark of LMSC, Inc. Reg. U.S. Pat. & Trademark Office.

(Revised May 198[illegible]) 20[illegible]

ONTAP ERIC
DIALOG FILE 201

SEARCH OPTIONS

All search options available for the ERIC database (File 1) may be used with the ONTAP ERIC file (see Bluesheet for File 1).

PROCEDURE

For training and practice the following procedure should be used:

- Choose a question from the list of 27 prepared for this file. The questions may be viewed online using the commands: ?TAPSIM for the list of simple questions, ?TAPMED for the list of medium questions, and ?TAPDIF for the list of difficult questions.
- Search the question using your own design of strategy.
- Locate the answer set for this question by SELECTing AN= (your chosen question number), e.g., SELECT AN=S02 for Simple Question 2.
- COMBINE result of your search with the answer set in an AND relationship to see how many in the answer set are the same as those you retrieved.
- Enter /EVAL(A,B,C) where:

  A = number of records in your search set
  B = number of records in the ONTAP answer set
  C = number of records in the COMBINEd A and B set

EXAMPLE

Question: S03 4-H CLUBS, THEIR MEMBERS AND ACTIVITIES

```
? BEGIN 201<---------------------------------------------- BEGIN in File 201,
         7apr81 12:17:29 User3476                            ONTAP ERIC
  $0.13  0.005 Hrs File1*
File201:ONTAP ERIC
(Copr. LMSC Inc.)
(END/SAVE, END/SDI, .EXECUTE, .RECALL, & .RELEASE invalid for file)
         Set Items Description
         --- ----- -----------
? SS 4(W)H(W)CLUB? OR FOUR(W)H(W)CLUB? |
           1    12 4(W)H(W)CLUB?        |
           2     0 FOUR(W)H(W)CLUB?     |<---------- Your search strategy
           3    12  1 OR 2
? SELECT AN=S03<---------------------------------------- SELECT answer set for
           4    17 AN=S03  (4-H CLUBS,MEMBERS & ACTIVITIES)  Simple Question 3
? COMBINE 3 AND 4<---------------------------------- COMBINE answer set with
           5    11  3 AND 4                                your results
? /EVAL (12,17,11)<--------------------------------- Request evaluation of
INPUT...EVAL (12,17,11)                                    your search
NUMBER OF CITATIONS FOUND=  12
NUMBER OF CITATIONS IN ANSWER SET=  17
NUMBER OF RELEVANT CITATIONS FOUND=  11
RECALL=  64.706 %    PRECISION=  91.667 %
```

EVALUATION

The evaluation command (/EVAL) gives you "recall" and "precision" scores.

RECALL	The percent of relevant records in the file that you found (i.e., it is a score of ability to find what is relevant in the file)
PRECISION	The percent of records in your results that are relevant to the topic (i.e., it is a score of ability to avoid unwanted citations)

The search on any of the questions may be performed again using different search strategies to try to improve the "recall" or "precision" scores.

Citations may be TYPEd online to see the indexing of each record (and how it was retrieved).

```
? TYPE 5
5/2/1
EJ120500  CE503267
  The 4-H Program Assistant's Role
  Parsons, Jerry; Kiesow, John
  Journal of Extension, 13, 11-8    1975
  Language: ENGLISH
  Descriptors:   *Paraprofessional  Personnel/  *Role Models/  *Staff Role/
*Task Analysis/  Young Farmer  Education/   *Youth  Opportunities/   *Youth
Programs
  Identifiers: 4 H Clubs
```

1

ERIC

DIALOG INFORMATION RETRIEVAL SERVICE

FILE DESCRIPTION

ERIC is the complete database of educational materials collected by the Educational Resources Information Center. It consists of two subfiles: *Resources in Education* (RIE), which is concerned with the most significant and timely nonjournal education literature; and *Current Index to Journals in Education* (CIJE), an index to more than 700 periodicals of interest to every segment of the education profession. These correspond to the printed indexes of the same names.

SUBJECT COVERAGE

The ERIC database includes a wide variety of educational information organized by the following broad subject areas:

- Adult, Career, and Vocational Education
- Counseling and Personnel Services
- Elementary and Early Childhood Education
- Educational Management
- Handicapped and Gifted Children
- Higher Education
- Information Resources
- Junior Colleges
- Languages and Linguistics
- Reading and Communication Skills
- Rural Education and Small Schools
- Science, Mathematics, and Environmental Education
- Social Studies/Social Science Education
- Teacher Education
- Tests, Measurement, and Evaluation
- Urban Education

SOURCES

ERIC collects and indexes journal articles as well as many other document types: research reports, evaluation studies, curriculum guides, lesson plans, bibliographies, course descriptions, theses, pamphlets, and other "fugitive" materials. All non-copyrighted items can be purchased from the ERIC Document Reproduction Service (EDRS) in paper copy or microfiche. There are approximately 650 locations throughout the country having collections of the ERIC microfiche, and most are open to the general public.

DIALOG FILE DATA

Inclusive Dates:	1966 to the present
Update Frequency:	Monthly (approximately 3,000 records per month)
File Size:	423,263 records as of March 1981

ORIGIN

ERIC is produced by:

National Institute of Education
Educational Resources Information Center
Washington, DC 20208

Questions concerning file content should be directed to:

ERIC Processing and Reference Facility
4833 Rugby Avenue, Suite 303
Bethesda, MD 20014

Telephone: 301/656-9723

No special terms or conditions.

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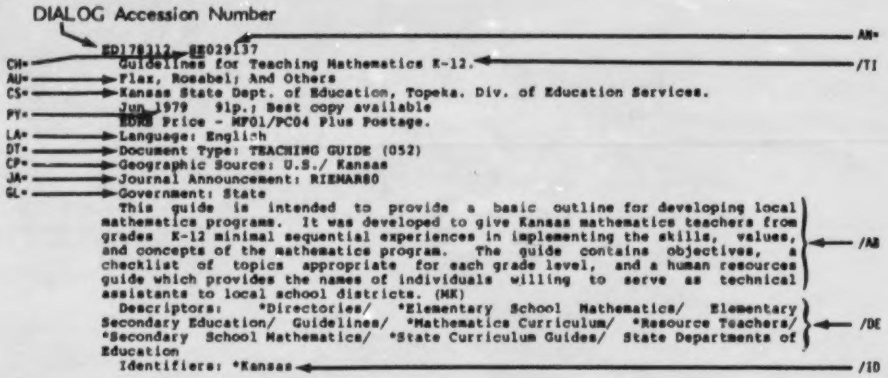
(Revised April 1981) I-1

ERIC
DIALOG FILE 1

SAMPLE RECORD


DIALOG Accession Number
AN=
/TI
CH=
AU=
CS=
PY=
LA=
DT=
CP=
JA=
GL=
/AB
/DE
/ID

```
ED178312  SE029137
  Guidelines for Teaching Mathematics K-12.
  Flax, Rosabel; And Others
  Kansas State Dept. of Education, Topeka. Div. of Education Services.
  Jun 1979   91p.; Best copy available
  EDRS Price - MF01/PC04 Plus Postage.
  Language: English
  Document Type: TEACHING GUIDE (052)
  Geographic Source: U.S./ Kansas
  Journal Announcement: RIEMAR80
  Government: State
  This  guide  is  intended  to  provide  a  basic  outline for developing local
mathematics programs.  It was developed to give Kansas mathematics teachers from
grades  K-12 minimal sequential experiences in implementing the skills,  values,
and concepts of the mathematics program.  The  guide  contains  objectives,   a
checklist  of  topics  appropriate  for each grade level,  and a human resources
guide which provides the names of individuals  willing  to  serve  as  technical
assistants to local school districts. (MK)
  Descriptors:   *Directories/  *Elementary  School  Mathematics/  Elementary
Secondary Education/  Guidelines/  *Mathematics Curriculum/  *Resource Teachers/
*Secondary  School Mathematics/  *State Curriculum Guides/  State Departments of
Education
  Identifiers: *Kansas
```

SEARCH OPTIONS

BASIC INDEX

PAGE	SUFFIX	FIELD NAME	EXAMPLES
1-3	None	Basic Index (includes Abstract, Descriptor, Identifier, and Title)	E SKILLS S RESOURCE?
1-3	/AB	Abstract	S MATHEMATICS(W)PROGRAM?/AB
1-4	/DE	Descriptor[1]	S MATHEMATICS CURRICULUM/DE
1-8	/ID	Identifier[2]	S KANSAS/ID
1-10	/TI	Title	S TEACHING(F)GUIDELINES/TI

[1] Also /DE*, /DF, /DF*.

[2] Also /ID*, /IF, /IF*.

ADDITIONAL INDEXES

PAGE	PREFIX	FIELD NAME	EXAMPLES	
1-11	AN=	Clearinghouse Number	E AN=VT203158	S AN=SE029137
1-12	AU=	Author	E AU=BOOKER, E	S AU=FLAX, R?
1-13	CH=	Clearinghouse Code	E CH=VT	S CH=SE
1-14	CN=	Contract/Grant Number[3]	E CN=NIDA	S CN=NIDA-5-H81-DA-01496-03
1-14	CP=	Country of Publication[3,4]	E CP=JAPAN	S CP=U.S.
1-14	CS=	Corporate Source[3]	E CS=BBB10844	S CS=KANSAS(F)CS=STATE(F)CS=EDUCATION
1-15	DT=	Document Type	E DT=TEACHING GUIDE	S DT=052
1-17	GL=	Government Level[3,4]	E GL=FOREIGN	S GL=STATE
1-18	JA=	Journal Announcement[5]	E JA=CIJMAY80	S JA=RIEMAR80
1-18	JN=	Journal Name	E JN=LIBRARY	S JN=READING HORIZONS
1-18	LA=	Language[4]	E LA=FRENCH	S LA=GERMAN
1-19	PN=	Bureau/Project Number[3]	E PN=BR	S PN=BR-7-0883
1-20	PY=	Publication Year	E PY=1964	S PY=1979
1-20	RN=	Report Number[3]	E RN=ADM	S RN=ADM-79-678
1-20	SP=	Sponsoring Agency[3]	E SP=INST	S SP=BABCOCK(W)SP=FOUNDATION
1-21	UD=	Update	E UD=8103	S UD=9999
1-22	ZZ=	Rotated Descriptors	E ZZ=ABILITY	(Select from EXPAND display)

[3] RIE records only.

[4] For records from 1979 to the present.

[5] From 1969 to the present for RIE records; from March 1979 to the present for CIJE records.

LIMITING

PAGE	SUFFIX	FIELD NAME	EXAMPLES	
1-23	/ED	Accession Numbers and/or RIE Subfile	LIMIT 1/174744-999999/ED	LIMIT 4/ED
1-23	/EJ	Accession Numbers and/or CIJE Subfile	LIMIT 5/207485-999999/EJ	LIMIT 8/EJ
1-24	/AVAIL	Document Available from EDRS	LIMIT 6/AVAIL	
1-24	/UNAVAIL	Document Not Available from EDRS	LIMIT 14/UNAVAIL	
1-25	/MAJ	Major Descriptor or Identifier	LIMIT 7/MAJ	
1-25	/MIN	Minor Descriptor or Identifier	LIMIT 9/MIN	

SORTING

PAGE	SORTABLE FIELDS	EXAMPLES
1-26	Online (.SORT) and offline (PRINT). AU, CS, JN, PY, TI.	.SORT 8/1-56/JN/PY PRINT 15/5/1-129/AU

FORMAT OPTIONS

PAGE	NUMBER	RECORD CONTENT	NUMBER	RECORD CONTENT
1-32	Format 1	DIALOG Accession Number	Format 5	Full Record
	Format 2	Full Record except Abstract	Format 6	Title and DIALOG Accession Number
	Format 3	Bibliographic Citation	Format 7	Bibliographic Citation and Abstract
	Format 4	Abstract and Title	Format 8	Title and Indexing

DIRECT RECORD ACCESS

PAGE	PREFIX	FIELD NAME	EXAMPLES	
1-36	None	DIALOG Accession Number	TYPE ED178312/6	PRINT EJ207531/5

SEARCH OPTIONS

Searching may be performed in either the Basic Index or any of the Additional Indexes. The Basic Index provides direct access to subject or text words and phrases. A particular field within the Basic Index may be specified using a suffix code, e.g., /TI to restrict the search to the Title field. The Additional Indexes provide access to all other fields available for searching. Prefix codes are used to search the Additional Indexes, e.g., AU= to search on a particular author's name.

BASIC INDEX

The Basic Index contains all assigned descriptors (terms from the *Thesaurus of ERIC Descriptors* (see Search Aids section)) and identifiers, plus all meaningful individual words from the Abstract, Descriptor, Identifier, and Title fields. Thus all words of subject importance can be searched without regard to their location within a given record. If a prefix or suffix is not specified in an EXPAND or SELECT command, the command is executed in the entire Basic Index. The full-text capability can be used to define a search statement further by specifying the desired proximity and order of words, their occurrence in a given field, or any combination of these as shown in the following sections.

ABSTRACT (/AB). Abstracts for the nonjournal literature (RIE items) are generally short (less than 200-word) summaries of the document contents. Abstracts for the journal articles (CIJE items) are generally brief (less than 50-word) annotations. Annotating is done only to enrich those articles with uninformative, non-expository titles. Over 90% of the articles announced in CIJE since 1978 include annotations.

The use of free language terms that might occur in abstracts, titles, or identifiers is particularly useful for search topics in new research areas for which the *Thesaurus* vocabulary may not be adequate.

Acronyms may be used in abstracts, although individual words generally are not abbreviated. Both the full phrase and its acronym should be used for maximum retrieval.

```
? SELECT MMPI/AB OR MINNESOTA(W)MULTIPHASIC(W)PERSONALITY/AB
                205 MMPI/AB
                130 MINNESOTA(W)MULTIPHASIC(W)PERSONALITY/AB
           1    254  MMPI/AB OR MINNESOTA(W)MULTIPHASIC(W)PERSONALIT
?TYPE 1/4
1/4/1
EJ233790
  MMPI Item  Responses  of Alcoholics in Treatment:  Comparisons
with Normals and Psychiatric Patients.
  Seven Minnesota Multiphasic Personality Inventory (MMPI)  items
distinguish  alcoholics in treatment from normals and psychiatric
patients. These items have substantial face validity. MMPI scales
developed as  screening   devices  for   alcoholism   did   not
discriminate  the  alcoholics  in  treatment  and the psychiatric
patients as strongly as did these seven items alone. (Author)
```

Names of individuals in the text of the abstract may or may not include initials or given name with the surname. Truncation is used in the following example to include the adjectival form of the name.

```
? SELECT PIAGET?/AB
            2  1728 PIAGET?/AB
? TYPE 2/4
2/4/1
EJ237907
  A  Paper-and-Pencil  Inventory  for  the Assessment of Piaget's
Tasks.
  Adapting curricula to  the  cognitive  developmental  level  of
students  has  been hindered by the difficulty of assessing those
levels  in  students.  The  reliability  and   validity   of   a
paper-and-pencil  Piagetian  assessment  are discussed.  (Author/
JKS)
```

However, searching is seldom performed in the Abstract field alone. In most searches an unsuffixed entry is used for more comprehensive results, e.g.,

```
? SELECT PIAGET?
            3  2425 PIAGET?
```

DESCRIPTOR (/DE, /DE*, /DF, /DF*). Descriptors are single-word or multiword subject terms assigned from the *Thesaurus of ERIC Descriptors* (see Search Aids section) to characterize the substantive content of the original document. An average of eleven descriptors are assigned to each indexed document in the RIE portion of the database, and seven descriptors to the articles in the CIJE portion of the database. The assignment of descriptors from the *Thesaurus* is discussed in detail in the *ERIC Processing Manual* (see Search Aids section). The *Thesaurus* is reissued annually to incorporate vocabulary changes, which are reflected in the indexing of new records. To date, all records in the file are indexed from the completely revised 1980 edition of the *Thesaurus*. Changes and corrections to the printed *Thesaurus* of importance to online searchers are listed on page ix of the *Thesaurus* and in the "New Thesaurus Terms" lists in the monthly issues of the printed RIE and CIJE indexes.

Thesaurus terms and the relationships among them have been incorporated into the online index as an aid to DIALOG system searchers. It is possible to view the relationships by further EXPANDing any term in the Basic Index that shows postings under the "RT" heading, as illustrated below.

```
? EXPAND STUDENT MOBILITY
Ref  Index-term              Type Items RT
E1   STUDENT LOAN INSURANCE
       FUND------------------       1
E2   STUDENT LOAN MARKETING
       ASSOCIATION-----------       2
E3   STUDENT LOAN PROGRAMS---     565 21
E4   STUDENT LOBBIES---------       1
E5   STUDENT MALADJUSTMENT---          1
E6  -STUDENT MOBILITY  (GEOGR
       APHIC MOBILITY OF-----     256 10
E7   STUDENT MOTIVATION------    3801  9
E8   STUDENT NATIONAL
       EDUCATION ASSOCIATION-       3
E9   STUDENT NEED------------       1
E10  STUDENT NEEDS-----------    3854 12
E11  STUDENT NEEDS
       ASSESSMENT PROGRAM----       1
E12  STUDENT NEIGHBORHOOD
       RELATIONSHIP----------       1
E13  STUDENT NONVIOLENT COORD
       INATING COMMITTEE-----       2
                                 -more-
? EXPAND E6
Ref  Index-term              Type Items RT
R1   STUDENT MOBILITY  (GEOGR
       APHIC MOBILITY OF-----     256 10
R2   GEOGRAPHIC MOBILITY-----B      4 12
R3   COLLEGE TRANSFER
       STUDENTS--------------R    158  7
R4   FAMILY MOBILITY---------R     85  6
R5   MIGRANT CHILDREN--------R    385  8
R6   MIGRANT EDUCATION-------R    958 15
R7   MIGRANT YOUTH-----------R     94  9
R8   STUDENT RECRUITMENT-----R    576  8
R9   STUDENTS----------------R105410 82
R10  TRANSFER STUDENTS-------R    715 16
R11  TRANSIENT CHILDREN------R     49  7
```

The following term relationships are coded in the "Type" column:

B - Broader term
N - Narrower term
R - Related term
U - Use or Used for

Terms such as E5 above (without postings in the "Items" column but with a related-term posting) are included to provide cross references to proper *Thesaurus* terms. Thus the E reference number should be EXPANDed to locate the preferred term, e.g.,

```
? EXPAND E5
Ref  Index-term              Type Items RT
R1   STUDENT MALADJUSTMENT---          1
R2   STUDENT ADJUSTMENT------U    623 12
```

Here the "U" indicates that "student adjustment" should be used instead of "student maladjustment".

Related terms from the *Thesaurus* can be EXPANDed directly by enclosing the *Thesaurus* term in parentheses, e.g.,

```
? EXPAND (LITERATURE APPRECIATION)
Ref  Index-term             Type Items RT
R1   LITERATURE APPRECIATION-    1840  5
R2   READING ENJOYMENT-------U         1
R3   CHORAL SPEAKING---------R     60  6
R4   LITERATURE--------------R 25803 63
R5   ORAL INTERPRETATION-----R    173 10
R6   RECREATIONAL READING----R    274  9
```

Here the "U" indicates that "literature appreciation" is used for or preferred over "reading enjoyment". If a term without related terms is enclosed in parentheses, the EXPAND reverts to an alphabetical display.

Note that the 25,803 records posted to the single-word entry at R4, LITERATURE, include all occurrences of the term in the Basic Index: as a descriptor, but also as an identifier, title, or abstract word. To retrieve only records indexed to the descriptor word LITERATURE, it is necessary to SELECT the term with the /DE or /DF suffix, e.g.,

```
? SELECT R4
               4 25803 LITERATURE
? SELECT LITERATURE/DE
               5 17367 LITERATURE/DE
```

Some *Thesaurus* terms may include a scope note for further definition. Scope notes are not entered when the term is SELECTed, but appear in the system response, e.g.,

```
? SELECT CHANGE AGENTS
               6  2361 CHANGE AGENTS  (PERSONS OR GROUPS WHO ATTEMPT CHAN
```

Long terms or terms with long scope notes are truncated at 50 characters, as is the entry above.

Some *Thesaurus* terms may include a parenthetical word or phrase as part of the term. In such a case the parenthetical expression must be included in the entry to restrict retrieval to that specific term. Such descriptor entries require a single space between the word or phrase and the parenthetical expression, e.g.,

```
? SELECT GUESSING (TESTS)
               7   187 GUESSING (TESTS)  (RESPONDING TO TEST ITEMS WITH
```

As many as six descriptors may be designated as "major" descriptors. The major descriptors are used as subject index entries for the printed issues of RIE and CIJE, and appear in both the printed issues and the online records with a preceding asterisk.

```
? TEJ204379
EJ204379/2
EJ204379  CG516597
  Anxiety  and  Instruction  Effects on Sixth-Grade Students in a
Testing Situation.
  Trentham, Landa L.
  Psychology in the Schools, v16 n3 p439-43     1979
  Reprint: UMI
  Language: ENGLISH
  Document Type: JOURNAL ARTICLE (080); RESEARCH REPORT (143)
  Descriptors: *Anxiety/  *Behavior Patterns/  *Creativity Tests/
Educational  Media/  Elementary  Education/  Elementary  School
students/ *Teaching Methods
```

Searching can be restricted to the major descriptors using the /DE* and /DF* suffixes illustrated below or using the LIMIT command discussed on page I-25.

All multiword descriptors are indexed both as full phrases as well as by each meaningful individual word of the phrase. It is possible to differentiate between single-word descriptors and the same single words extracted from multiword descriptors. The following example with the term "training" illustrates the varying degrees of specificity and differences in postings:

```
? SELECT TRAINING; S TRAINING/DE; S TRAINING/DE*
            8 47809 TRAINING  (INSTRUCTIONAL PROCESS AIMED AT THE AC
            9 19792 TRAINING  (INSTRUCTIONAL PROCESS AIMED AT THE AC
           10 12020 TRAINING  (INSTRUCTIONAL PROCESS AIMED AT THE AC
? SELECT TRAINING/DF; S TRAINING/DF*
           11  2207 TRAINING  (INSTRUCTIONAL PROCESS AIMED AT THE AC
           12  1099 TRAINING  (INSTRUCTIONAL PROCESS AIMED AT THE AC
```

In set 8, the term is retrieved from any field in the Basic Index. In set 9, the term is retrieved from single-word or multiword descriptors, such as TRAINING, LEADERSHIP TRAINING, PROFESSIONAL TRAINING, TRANSFER OF TRAINING, etc. However, in set 10 the term is retrieved from these descriptors only if they have been asterisked as major. In sets 11 and 12 retrieval is restricted to the single-word descriptor TRAINING, and in the latter instance the word must have been asterisked as a major descriptor.

Note that when scope-noted descriptors are SELECTed with a suffix, the suffix does not appear in the system response. In the case of single-word descriptors, the scope note appears in the system response whether or not the word has been restricted to the Descriptor field.

When the multiword descriptors are indexed under the individual words of the phrase, a few common words without subject content are omitted from the index. To search for phrases containing such "stop" words, the descriptor phrase can be SELECTed as a unit, e.g.,

```
? SELECT FREEDOM OF SPEECH
           13    947 FREEDOM OF SPEECH
```

However, if full-text methods are used, the "of" must be excluded, but counted, e.g.,

```
? SELECT FREEDOM(1W)SPEECH/DE
           14    947 FREEDOM(1W)SPEECH/DE
```

The search can be broadened by removing the restriction to the Descriptor field, e.g.,

```
 ? SELECT FREEDOM(1W)SPEECH
           15    982 FREEDOM(1W)SPEECH
```

The additional records retrieved in set 15 have the phrase in other fields of the Basic Index, e.g., the Abstract, Identifier, or Title fields.

Multiword descriptors that include one of the logical operators can be SELECTed as a phrase, but the operator must be enclosed in either single or double quotes in order to distinguish it from the Boolean operator, e.g.,

```
 ? SELECT FOOD 'AND' DRUG INSPECTORS
           16     20 FOOD AND DRUG INSPECTORS
```

IDENTIFIER (/ID, /ID*, /IF, /IF*). Identifiers are single-word or multiword terms assigned to provide additional subject indexing beyond descriptor terms. Identifiers are semi-controlled free-language terms and tend to be more specific than the *Thesaurus* vocabulary, e.g, project names, legislation, geographic locations, and other subject terms which have not yet achieved broad acceptance. An *Identifier Authority List* is available from ERIC (see Search Aids section). Guidelines for the creation of new identifiers are included in the *ERIC Processing Manual* (see Search Aids section). One or two identifiers per record may be asterisked to designate them as "major".

When identifier phrases are entered into the Basic Index, they are allowed a maximum of 42 characters in length. Identifiers exceeding this length can be entered, but only the first 42 characters are read.

```
 ? SELECT FROSTIG DEVELOPMENTAL TEST OF VISUAL PERCEPTION
           17     46 FROSTIG DEVELOPMENTAL TEST OF VISUAL PERCEPTION
 ? TYPE 17/8
 17/8/1
 EJ234926
   The  Relationship between Performance on the Developmental Test
 of Visual Perception and Handwriting Ability.
   Descriptors:  *Elementary Education/  *Grade  1/  *Handwriting
 Skills/   *Performance/   *Relationship/   Test Results/  *Visual
 Perception
   Identifiers: *Frostig Developmental Test of Visual Perception
```

However, since identifiers are only partially controlled and the exact form of entry may not be known, full-text methods should be used for better retrieval, e.g.,

```
 ? SELECT FROSTIG(F)TEST/ID
           18     48 FROSTIG(F)TEST/ID
```

The two additional items retrieved include variations of the standardized identifier entry. For more comprehensive retrieval, an unsuffixed entry can be used to extend the search to all Basic Index fields.

```
? SELECT FROSTIG(F)TEST
           19    85 FROSTIG(F)TEST
```

Geopolitical identifiers begin with the name of a state (U.S.), province (Canada), or country (all others) and include the local name as a parenthetical qualifier, e.g.,

```
? SELECT TENNESSEE (MEMPHIS)
           20    45 TENNESSEE (MEMPHIS)
? TYPE 20/8
20/8/1
EJ220704
  Conflict and Confusion in CETA Goals: The Memphis Experience.
  Descriptors:   Economic  Development/  *Individual Development/
Professional Personnel/  *Program  Evaluation/  *Self  Concept/
*Staff Role
  Identifiers:   *Comprehensive  Employment  and  Training  Act/
Tennessee (Memphis)
```

U.S. institutions are identified by state with the two-character postal code, e.g.,

```
? SELECT MEMPHIS(F)TN/ID
           21    29 MEMPHIS(F)TN/ID
? TYPE 21/8
21/8/1
EJ214257
  Here's How Memphis Cut Vandalism Costs in Half.
  Descriptors:   *Alarm  Systems/  Costs/  Elementary Secondary
Education/ *School Security/ School Vandalism
  Identifiers: Memphis City Schools TN
```

For more comprehensive retrieval, the entire Basic Index can be searched, e.g.,

```
? SELECT MEMPHIS
           22   186 MEMPHIS
```

Personal names may be used as identifiers and are entered with surname first. However, for comprehensive searching, the entered term should have a format compatible with all fields in which it is likely to occur. For very well-known names, the surname may be specific enough, e.g., SELECT SHAKESPEARE. For less unique surnames, the initials and/or name should be included in the entry, e.g., SELECT E(W)B(F)WHITE.

Each identifier is indexed as both the full phrase and under each meaningful individual word of the phrase. In order to differentiate between single-word identifiers and the same single words extracted from multiword identifiers, the /IF and /IF* suffixes can be used. For example,

```
? SELECT STANDARDIZATION/ID
           23    19 STANDARDIZATION/ID
```

retrieves such identifiers as STANDARDIZATION, TEST STANDARDIZATION, and INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, while

```
? SELECT STANDARDIZATION/ID*
           24     10 STANDARDIZATION/ID*
```

retrieves these same identifiers only if they have been asterisked as major, but

```
? SELECT STANDARDIZATION/IF
           25      8 STANDARDIZATION/IF
```

retrieves only the single-word identifier, and

```
? SELECT STANDARDIZATION/IF*
           26      2 STANDARDIZATION/IF*
```

retrieves the single-word identifier only if it has been asterisked as major.

TITLE (/TI). The complete title is displayed as it appears on the original document, including alternative title, subtitle, and other associated descriptive matter. All meaningful individual words from the title are searchable. Any hyphenated words are separated into their component parts and must be searched using full-text methods. Thus, to find titles with the term "non-print", the following command is entered:

```
? SELECT NON(W)PRINT/TI OR NONPRINT/TI
                  55 NON(W)PRINT/TI
                  40 NONPRINT/TI
          27    95  NON(W)PRINT/TI OR NONPRINT/TI
? TYPE 27/6/1-2
27/6/1
EJ234047
  Non-Print Media: Young Adults and What TV Is Doing for Them.

27/6/2
EJ232598
  NICEM, The Non-Print Database.
```

Note that "nonprint" has also been entered as a single word for more complete retrieval.

Non-English language titles are followed by an English language translation when the record is TYPEd or PRINTed. Words from the translation as well as the title are searchable.

Title searching gives precise, but not comprehensive, results. In most searches the Title field is searched together with other Basic Index fields, e.g.,

```
? SELECT NON(W)PRINT/TI,DE,ID OR NONPRINT/TI,DE,ID
                  55 NON(W)PRINT/TI,DE,ID
                 141 NONPRINT/TI,DE,ID
          28   186  NON(W)PRINT/TI,DE,ID OR NONPRINT/TI,DE,ID
```

Search results can be sorted by title as described on page I-26.

ADDITIONAL INDEXES

The Additional Indexes in ERIC include all searchable fields that are not included in the Basic Index. Searching in the Additional Indexes requires the use of a prefix code. The format of the individual indexes may vary according to the type of information included, e.g., the Publication Year field (PY=) is composed of four-digit numbers whereas the Author field (AU=) is composed of the name of the author entered as a full character string. The access features of each of the Additional Indexes are described in the following sections.

CLEARINGHOUSE NUMBER (AN=). Currently there are 16 clearinghouses located at various universities and professional organizations throughout the United States which are responsible for acquiring, indexing, and abstracting the reports and journal articles relevant to their respective subject area specialty.

Each clearinghouse assigns a temporary accession number to each document it inputs. The clearinghouse number is searchable in the AN= field as an eight-character entry with no spaces, e.g., SELECT AN=SE526031.

This field is useful for retrieving the references to earlier ERIC entries which are sometimes found in ERIC records, e.g.,

```
EJ207366   TM504406
  The Algebra Works--But What Does It Mean?
  Brown, F. G.
  School Psychology Digest, v8 n2 p213-18 Spr      1979
  Language: ENGLISH
  Document Type: JOURNAL ARTICLE (080); POSITION PAPER (120)
  Although  agreeing that the System of Multicultural Pluralistic
Assessment (SOMPA) has an important purpose, the author questions
some perceived weaknesses: test validity; medical model measures;
sociocultural scales; estimated learning potential (ELP); and the
incompleteness of SOMPA manuals for use in evaluating the system.
(See also TM 504 174). (MH)
  Descriptors:   Biological   Influences/   *Diagnostic   Tests/
*Educational   Testing/   Scores/   Testing   Problems/   *Test
Interpretation/ Test Reviews/ *Test Validity
  Identifiers:   Estimated   Learning   Potential/   *System   of
Multicultural Pluralistic Assessment
```

To retrieve this reference, enter the alphanumeric string without spaces between characters.

```
? SELECT AN=TM504174
          29      1 AN=TM504174
? TYPE 29/2
29/2/1
EJ200593  TM504174
  In   Defense   of   Racially   and   Culturally   Non-Discriminatory
Assessment.
  Mercer, Jane R.
  School Psychology Digest, v8 n1 p89-115 Win      1979
  Language: ENGLISH
  Document Type:  JOURNAL ARTICLE (080);  POSITION   PAPER   (120);
REVIEW LITERATURE (070)
⋮
```

AUTHOR (AU=). Up to two individual authors per document may be listed in an online record. If there are more than two authors, only the first author is listed followed by "And Others". Author names generally appear as listed in the source document. The following EXPAND of the AU= index illustrates the format of the entries.

```
   ? EXPAND AU=MOORE, JOHN W.
   Ref  Index-term            Type Items RT
   E1   AU=MOORE, JOHN M.-------      3
   E2   AU=MOORE, JOHN N.-------      4
   E3   AU=MOORE, JOHN P.-------      1
   E4   AU=MOORE, JOHN R.-------      2
   E5   AU=MOORE, JOHN ROBERT---      1
——►E6  -AU=MOORE, JOHN W.-------     15
——►E7   AU=MOORE, JOHN W., ED.--     11
   E8   AU=MOORE, JOHNNA--------      1
   E9   AU=MOORE, JOSEPH--------      2
   E10  AU=MOORE, JOSEPH A.-----      3
   E11  AU=MOORE, JOSEPH B.-----      1
   E12  AU=MOORE, JOSEPH H.-----      7
   E13  AU=MOORE, JOSEPH T.-----      1
   E14  AU=MOORE, JOSIAH--------      1
   E15  AU=MOORE, JUDY----------      1
   E16  AU=MOORE, JULIA THOMPSON      1
   E17  AU=MOORE, JULIE L.------      2
   E18  AU=MOORE, JUNE----------      6
   E19  AU=MOORE, JUSTIN R.-----      1
   E20  AU=MOORE, K. E.---------      1
                                   -more-
```

Author names may include full given name or initials, or some combination of name(s) and initials with spacing and punctuation. Variations exist, depending on the source document. If the individual edited, rather than wrote, the document, "ED." is appended to the name, as in the entry at E7. EXPANDing is recommended prior to SELECTing an author name.

```
? SELECT E6,E7
         30     26 E6,E7
                   E6: AU=MOORE, JOHN W.
```

Compound author names are usually entered as they appear on the document, with spacing and/or hyphenation retained. Examples of compound AU= entries are:

GARCIA MERCADAL, JOSE
GARCIA-RIVERA, OSCAR
DE L'AUNE, WILLIAM R.
LA FRANCE, MARIANNE
VON BORSTEL, R. C.
SMITH-LOVIN, LYNN

Search results can be sorted by author as described on page I-26.

CLEARINGHOUSE CODE (CH=). Each of the 16 clearinghouses responsible for the ERIC entries relevant to its respective subject area speciality assigns a temporary accession number to each document it inputs, which is searchable in the AN= field (see page I-11). The two-letter clearinghouse code which begins this number and designates the responsible clearinghouse is searchable in the CH= field. For example, SELECT CH=SE retrieves all documents indexed by the Science, Mathematics, and Environmental Education Clearinghouse. The clearinghouse code can be used as a broad subject area restriction in a search strategy as illustrated below.

```
? SELECT SECONDARY(W)EDUCATION AND CH=SE
              58281 SECONDARY(W)EDUCATION
              40843 CH=SE
          31   7873  SECONDARY(W)EDUCATION AND CH=SE
```

In set 31 the search has been restricted to the term "secondary education" in documents indexed by the Science, Mathematics, and Environmental Education Clearinghouse.

Over the timespan of the database, there have been some changes in the number of clearinghouses as well as in their codes. The current clearinghouse codes and previous codes are listed below.

Clearinghouse Codes (CH=)

AA - ERIC Facility Contractor (For CIJE records: Oryx Press since March 1979, previously Macmillan Information. Discontinued for RIE records March 1973).
AC - Adult Education (merged into CE in 1973)
AL - Linguistics (merged into FL in 1971)
CE - Adult, Career, and Vocational Education
CG - Counseling and Personnel Services
CS - Reading and Communication Skills
EA - Educational Management
EC - Handicapped and Gifted Children
EF - Educational Facilities (merged into EA in 1970)
EM - Educational Media and Technology (merged into IR in 1974)
FL - Languages and Linguistics
HE - Higher Education
IR - Information Resources
JC - Junior Colleges
LI - Library and Information Sciences (merged into IR in 1974)
PS - Early Childhood Education
RC - Rural Education and Small Schools
RE - Reading (merged into CS in 1972)
SE - Science, Mathematics, and Environmental Education
SO - Social Studies/Social Science Education
SP - Teacher Education
TE - Teaching of English (merged into CS in 1972)
TM - Tests, Measurement, and Evaluation
UD - Urban Education
VT - Vocational and Technical Education (merged into CE in 1973)

To search in a subject area covered by a clearinghouse which was discontinued and merged with another, SELECT the old and the new codes. For example, for a broad search on Library and Information Sciences:

```
? SELECT CH=LI OR CH=IR
                 6227 CH=LI
                16800 CH=IR
           32 23027  CH=LI OR CH=IR
```

CONTRACT/GRANT NUMBER (CN=). If the contract or grant numbers assigned by sponsoring agencies are plainly apparent on the document, they are included in this field for RIE records. Prior to July 1976, only U.S. Office of Education (OE) or National Institute of Education (NIE) grant and contract numbers were indexed in this field.

Contract and grant numbers generally include an alphabetic prefix followed by a variable number of digits. Some typical contract and grant numbers are:

CN=OE-0-73-7094
CN=OCD-CB-02(C4)
CN=NIE-C-400-74-0015
CN=N61339-73-C-0097

All contract and grant numbers beginning with alphabetic characters are cascaded to the alphabetic prefix (letters preceding first hyphen). Thus SELECT CN=OCD includes CN=OCD-CB-02(C4) and all other contract numbers beginning with "OCD". This field is not used for CIJE items.

COUNTRY OF PUBLICATION (CP=). Beginning with records entered in January 1979, the country of publication is included for all RIE documents. This geographic source of document is intended to indicate primarily the country of origin (usually the place of publication). For documents originating in the United States, United Kingdom, Canada, and Australia, the state, unit, province, or division is indexed as well. In the case of all other countries, further subdivision is not used. Geographic names are spelled out in full, except that the United States is indexed as CP=U.S.

Multiword place names are searchable as phrases or using full-text methods:

```
? SELECT CP=SOUTH CAROLINA
           33    347 CP=SOUTH CAROLINA
? SELECT CP=SOUTH(W)CP=CAROLINA
           34    347 CP=SOUTH(W)CP=CAROLINA
```

The CP= field is not used for CIJE records.

CORPORATE SOURCE (CS=). The Corporate Source field, found only in RIE items, is used to list the organization responsible for the issuance of the document. (It is not the address of the first personal author.) Each corporate source name has been entered in a standardized form and corresponds to a specific eight-character alphanumeric institution code also searchable in the CS= field.

Each meaningful individual word of the name has been indexed. Therefore, full-text methods are used to search corporate source names. It is generally best to SELECT only the most specific parts of the name and ignore the more common words.

Abbreviations may be used. For example, to find documents issued by the various divisions of the Pennsylvania State Dept. of Education,

```
? SELECT CS=PENNSYLVANIA(W)CS=STATE(2W)CS=EDUCATION
          35    428 CS=PENNSYLVANIA(W)CS=STATE(2W)CS=EDUCATION
? TYPE 35/3
35/3/1
ED194470
  Self   Assessment   Instrument   for   School Nursing-School Health
Services.
  Pennsylvania State Dept. of Education, Harrisburg.
  18p.  Oct 1980
  EDRS Price - MF01/PC01 Plus Postage.
```

The CS= prefix must be repeated with each word of the name searched.

If the exact form of the name as entered in the file is unknown, use the (F) or the AND operator to SELECT the key words in the name, e.g.,

```
? SELECT CS=PENNSYLVANIA(F)CS=STATE(F)CS=EDUCATION
          36    721 CS=PENNSYLVANIA(F)CS=STATE(F)CS=EDUCATION
? SELECT CS=PENNSYLVANIA AND CS=STATE AND CS=EDUCATION
                1631 CS=PENNSYLVANIA
               24900 CS=STATE
               35768 CS=EDUCATION
          37    721  CS=PENNSYLVANIA AND CS=STATE AND CS=EDUCATION
```

Retrieval is less precise than in the earlier example, as it includes Pennsylvania State Univ., University Park, Dept. of Agricultural Education, for example, as a corporate source.

The eight-character alphanumeric code assigned by ERIC to each originating institution and each sponsoring agency is also searchable in this field. An alphabetic directory of the institutions and sponsoring agencies and their codes is available (see Search Aids section). Codes include three letters followed by five digits, e.g., CS=SYN71650 for the Pennsylvania State Dept. of Education, Harrisburg, or CS=BBB09096 for the Bureau of Curriculum Services within the Pennsylvania State Dept. of Education, Harrisburg. Each division of an institution is assigned a unique code. In this case, the code CS=SYN71650 retrieves only those records with the Pennsylvania State Dept. of Education as corporate source or sponsoring agency which do not include a specific division within the department. To retrieve all divisions of an institution, the name should be searched with the CS= and/or SP= prefixes. When the code is SELECTed, the particular division is searched as both corporate source and as sponsoring agency. Institution codes do not display in TYPEd or PRINTed records.

Search results can be sorted by corporate source name as described on page I-26.

DOCUMENT TYPE (DT=). All ERIC records are indexed to indicate the form of the original publication, referred to as Publication Type or PUBTYPE by ERIC, and indexed as Document Type on the DIALOG system. Currently, 34 document types are used. These are three-digit codes, and are listed on page I-17, together with a one- or two-word name, assigned by the DIALOG system and based on the fuller description available in the *Thesaurus of ERIC Descriptors.* A more detailed discussion, including scope notes for the document types, can be found in the May 1979 *Interchange Newsletter* (see Search Aids section).

Up to three codes are permitted for a single document or article. Both the three-digit code and the DIALOG Service-assigned name have been indexed in the DT= field, and either form can be SELECTed. For example, to locate guides for teaching evolution (in or out of the classroom):

```
? SELECT EVOLUTION/DE AND DT=05?
                446 EVOLUTION/DE
              26844 DT=05?
         38     16  EVOLUTION/DE AND DT=05?
? TYPE 38/5
38/5/1
EJ214996  SE526385
  A Conceptual Model for the Study of Evolution.
  Bortone, Stephen A.
  American Biology Teacher, v41 n9 p562-63,565 Dec     1979
  Reprint: UMI
  Language: ENGLISH
  Document Type: JOURNAL ARTICLE (080); TEACHING GUIDE (052)
  Presents a model for teaching the principles of evolution.  The
model presents three major factors that direct changes and affect
an individual's fitness.  Uses and adaptations of the  model  are
suggested. (Author/SA)
  Descriptors: Biological Influences/  Biology/  College Science/
*Evolution/ Higher Education/  Instructional Materials/  *Models/
Science Curriculum/ *Science Instruction/ *Scientific Principles/
*Teaching Methods/ Theories/ Undergraduate Study
```

Note that truncating after the first two digits of the code retrieves all the different types of guides.

The Descriptor field is also used to indicate document type. Both fields should be used for comprehensive retrieval, e.g.,

```
? SELECT STEPS EVOLUTION/DE AND (DT=05? OR GUIDES/DE)
         39   446 EVOLUTION/DE
         40 26844 DT=05?
         41 21208 GUIDES  ((NOTE: CORRESPONDS TO PUBTYPE CODE 050--
         42    23  39 AND (40 OR 41)
```

Document type is coded for all RIE documents indexed in ERIC, beginning in September 1974. Prior to July 1979, only one code was assigned per document. Document type is coded for CIJE articles beginning in June 1979. Prior to that date, CIJE articles are not coded for document type. However, these records may be indexed with descriptors indicating document type.

Document Type (DT=)

(SELECT both code and type with DT=)

Code	Type	Code	Type
010	Book	090	Legal Material
020	Collection	100	Audiovisual Material
021	Conference Proceedings	110	Statistical Material
022	Serial	120	Position Paper
030	Creative Work	130	General Reference
040[1]	Dissertation	131	Bibliography
041[1]	Dissertation	132	Directory
042	Thesis	133	Geographic Material
043	Practicum Paper	134	Dictionary
050[2]	Classroom Material	140	General Report
051	Instructional Material	141	Project Description
052	Teaching Guide	142	Evaluative Report
055[3]	Non Classroom Material	143	Research Report
	Non-Classroom Material	150	Conference Paper
060	Historical Material	160	Test, Questionnaire
070	Review Literature	170	Translation
071	ERIC Product	999	Miscellaneous
080	Journal Article		

[1] To retrieve dissertations by code, it is necessary to use both codes indicated, e.g., SELECT DT=040 OR DT=041. Alternatively, SELECT DT=DISSERTATION.

[2] DT=050 should more accurately be labelled "General Guides". Material indexed with this code may be classroom or non-classroom oriented.

[3] To retrieve non-classroom materials by name, both forms of entry must be taken into account, e.g., SELECT DT=NON? Alternatively, SELECT DT=055.

GOVERNMENT LEVEL (GL=). Beginning in January 1979, the government level (federal, state, or local) is indicated for all RIE documents which are official publications of a governmental body. Contract reports are not considered to be government documents unless they have been issued as a publication of the agency involved.

The following governmental levels are indexed in the GL= field:

GL=FEDERAL	(Domestic U.S.--federal level)
GL=FOREIGN	(Non-U.S.--any level)
GL=INTERNATIONAL	(Multigovernmental bodies)
GL=LOCAL	(Domestic U.S.--city or county level)
GL=STATE	(Domestic U.S.--state level)

Since the majority of RIE documents originate in the United States, non-U.S. government documents are all indexed as GL=FOREIGN without a level indication. Documents of multigovernmental bodies such as the United Nations are indexed as GL=INTERNATIONAL.

JOURNAL ANNOUNCEMENT (JA=). The field is used to indicate the monthly issue of RIE (beginning in 1969) or CIJE (beginning in March 1979) in which the document is announced, e.g., JA=RIEAPR77 for all documents announced in the April 1977 issue of RIE or JA=CIJFEB80 for all documents announced in the February 1980 issue of CIJE. The form is always CIJ or RIE followed by the first three letters of the month, followed by the two-digit year.

JOURNAL NAME (JN=). Currently, full journal titles are entered in this field. Initial articles such as "A", "An", and "The" are omitted. Until 1971, periodical titles were abbreviated according to ANSI Standard Z39.5-1963, "Periodical Title Abbreviations". For comprehensive searching on a specific journal title, both forms should be SELECTed, e.g.,

```
? SELECT JN=PUBLIC OPIN QUART OR JN=PUBLIC OPINION QUARTERLY
                   24 JN=PUBLIC OPIN QUART
                   72 JN=PUBLIC OPINION QUARTERLY
          43     96  JN=PUBLIC OPIN QUART OR JN=PUBLIC OPINION QUART
```

This field is used primarily for CIJE documents, but may sometimes be used for RIE documents. EXPAND the journal name to verify the proper form of abbreviation if unavailable from other sources.

When SELECTing journal titles which include the word AND, the AND should be enclosed in single or double quotes to distinguish it from the Boolean operator, e.g.,

```
? SELECT JN=EDUCATION 'AND' TRAINING OF THE MENTALLY HANDICAPPED
          44     457 JN=EDUCATION AND TRAINING OF THE MENTALLY HANDIC
```

Note that longer journal names are abbreviated at the 39th character when indexed. Journal names exceeding this length can be entered, but only the first 39 characters are read for retrieval purposes.

Search results can be sorted by journal name as described on page 1-26.

LANGUAGE (LA=). Beginning in January 1979 the language of the document is indexed for all ERIC documents in both CIJE and RIE, and is searchable using the LA= prefix. Approximately 98% of ERIC documents are in English. Documents in more than one language have each language indexed, up to a maximum of five.

The following form of the major languages is used:

ARABIC
*BULGARIAN
CHINESE
CZECH
DANISH
DUTCH
ENGLISH
*ESPERANTO
FINNISH
FRENCH
GERMAN
HEBREW
*HINDI
*HUNGARIAN
INDONESIAN
*INTERLINGUA
ITALIAN
JAPANESE
KOREAN
LATIN
NORWEGIAN
*POLISH
PORTUGUESE
*ROMANIAN
RUSSIAN
*SANSKRIT
*SLOVAK
SPANISH
*SWAHILI
SWEDISH
TURKISH
*UKRAINIAN
*URDU

*Languages not used as of March 1981.

Also included are many uncommonly taught languages from the documents of the Language and Linguistics Clearinghouse, e.g.,

LA=ATHAPASCAN
LA=IBO
LA=INUPIAQ
LA=NEMBE
LA=YUPIK

The current listing of all languages in use may be accessed by EXPANDing LA=.

Multiword language names are indexed in full as well as word-by-word, e.g.,

```
? SELECT LA=WESTERN ALEUT
            45       3 LA=WESTERN ALEUT
? SELECT LA=WESTERN(W)LA=ALEUT
            46       3 LA=WESTERN(W)LA=ALEUT
```

All records indexed prior to January 1979 are indexed to LA=ENGLISH, whether appropriate or not.

BUREAU/PROJECT NUMBER (PN=). This field is used to list the alphanumeric code assigned by the sponsoring agency to the project for which the document was produced. Currently only OE and NIE project numbers are indexed.

Project numbers generally include an alphabetic prefix followed by a variable number of digits and/or additional letters. Some typical project numbers are:

PN=BR-H-127145B
PN=CG8119A/5
PN=L0008JA
PN=V-361057L

All project numbers are cascaded to the initial alphabetic prefix, i.e., letters preceding the first hyphen or first number. Thus SELECT PN=L retrieves PN=L0008JA and all other project numbers beginning with L.

The PN= field is used only for RIE documents.

PUBLICATION YEAR (PY=). The four-digit year of publication of the source document or article is indexed with the PY= prefix. Search results can be restricted to a particular year or range of years by combining a subject set with a publication year set, e.g.,

```
? SELECT DAY(W)CARE/DE AND PY=1980
                 2000 DAY(W)CARE/DE
                19395 PY=1980
          47      78  DAY(W)CARE/DE AND PY=1980
```

The colon (:) range searching feature can be used to SELECT a specified range of years, e.g.,

```
? SELECT DAY(W)CARE/DE AND PY=1979:PY=1981
                 2000 DAY(W)CARE/DE
                51480 PY=1979:PY=1981
          48     242  DAY(W)CARE/DE AND PY=1979:PY=1981
```

retrieves records on "day care" with publication years 1979, 1980, or 1981.

Search results can be sorted by publication year as described on page 1-26.

REPORT NUMBER (RN=). This field is used to index the unique identifying number(s) assigned to the publication by the organization(s) producing or issuing the document.

Report numbers generally include an alphabetic prefix followed by a variable number of digits and/or additional letters. Some typical report numbers are:

RN=AAAS-MISC-PUB-76-2
RN=DA-PAM-550-152
RN=RX74-15-HEW
RN=T-75-196-G

All report numbers are cascaded to the initial alphabetic prefix, letters preceding the first hyphen or first number. Thus SELECT RN=RX retrieves RN=RX74-15-HEW and all other report numbers beginning with RX. Some entry variations in format of report numbers may exist, so it is best to EXPAND in the RN= index to locate a specific report by its number.

This field is used only for RIE documents.

SPONSORING AGENCY (SP=). The Sponsoring Agency field is used to list the institution, e.g., government agency, private foundation, etc., other than the corporate author, which supported the work or production of the document by providing funds via contract or grant. This field is used only for RIE items. Each sponsoring agency name has been entered in a standardized form and corresponds to a specific eight-character alphanumeric code searchable in the CS= field. When the sponsoring agency is also the corporate author, the name is entered in the Corporate Source field and the SP= field is not used.

Each meaningful individual word of the name has been indexed. Therefore, full-text methods are used to search sponsoring agency names. It is generally best to SELECT only the most specific parts of the name and ignore the more common words. For example,

```
? SELECT SP=PENNSYLVANIA(W)SP=STATE(2W)SP=EDUCATION
          49    221 SP=PENNSYLVANIA(W)SP=STATE(2W)SP=EDUCATION
? TYPE 49/2/1
49/2/1
ED193191  SP016760
  Back to Basics. New Horizons in Nutrition.
  Arnold, Justine; Grogan, Jane, Ed.
  Luzerne Intermediate Unit 18, Kingston, Pa.
  1980   19p.; For related documents, see SP 016 752-761.
  Sponsoring  Agency:   Pennsylvania  State  Dept.  of Education,
Harrisburg. Bureau of Curriculum Services.
  EDRS Price - MF01/PC01 Plus Postage.
  Language: English
  Document Type:  INSTRUCTIONAL MATERIAL (051);   TEACHING  GUIDE
(052)
  Geographic Source: U.S./ Pennsylvania
  Journal Announcement: RIEFEB81
  Government: State
  Descriptors:   *Dietetics/   *Eating Habits/  Health Education/
*Human Body/ *Nutrition Instruction/ Physical Fitness/  *Physical
Health/ Secondary Education/ Self Care Skills
  Identifiers: *Vitamins
```

retrieves citations to reports sponsored or cosponsored by the Pennsylvania State Dept. of Education, Harrisburg.

The SP= prefix must be repeated with each word of the name searched. If the exact form of the name as entered in the file is unknown, use the (F) or the AND operator to SELECT the key words in the name.

Since the Sponsoring Agency field is not used if the report is sponsored by the issuing agency (corporate source), both the Corporate Source and Sponsoring Agency fields should be searched for maximum retrieval. Alternatively, the appropriate eight-digit corporate source/sponsoring agency code can be SELECTed to retrieve all occurrences of a particular division of an institution as either a corporate source or sponsoring agency.

UPDATE (UD=). The ERIC database is updated with new material on a monthly basis. All records entered in the file are assigned an update code of the form UD=YYMM, where the first two digits represent the year and the last two digits the month of entry into the database and appearance in the corresponding printed indexes.

Search results can be restricted to a given update of the database. This is particularly useful in updating a previous search or in restricting a search to the newest information only.

For the most recently added information, it is possible to SELECT UD=9999. This set always contains the newest update to the database, so that it can be combined with a subject set to retrieve only the most recently added records on a given subject.

ROTATED DESCRIPTORS (ZZ=). The *Thesaurus of ERIC Descriptors* includes a "Rotated Descriptor Display" which provides access to each descriptor word alphabetically (KWOC--Key Word Out-of-Context style). The entire descriptor is listed separately for each word it includes. This feature has been included online and is available by EXPANDing the ZZ= prefix field. For example, to locate all descriptors which include the word "planning":

```
? EXPAND ZZ=PLANNING
Ref  Index-term                Type Items RT
E1    ZZ=PLANE----------------      303
E2    ZZ=PLANE GEOMETRY-------       56
E3    ZZ=PLANETARIUMS---------       98
E4    ZZ=PLANNED--------------     4115
E5    ZZ=PLANNED COMMUNITIES--       41
E6   -ZZ=PLANNING-------------    35141
E7    ZZ=PLANNING COMMISSIONS-      142
E8    ZZ=PLANNING// CAMPUS----      485
E9    ZZ=PLANNING// CAREER----     2923
E10   ZZ=PLANNING// COLLEGE---      925
E11   ZZ=PLANNING// COLOR-----       60
E12   ZZ=PLANNING// COMMUNITY-      328
E13   ZZ=PLANNING//
        COOPERATIVE-----------     1396
E14   ZZ=PLANNING// CURRICULUM        1
E15   ZZ=PLANNING//
        EDUCATIONAL-----------     6341
E16   ZZ=PLANNING// EDUCATIONA
        L FACILITIES----------       38
E17   ZZ=PLANNING// ESTATE----       41
                                    -more-
? PAGE
Ref  Index-term                Type Items RT
E18   ZZ=PLANNING// FACILITY--      897
E19   ZZ=PLANNING// FAMILY----      700
E20   ZZ=PLANNING// LANGUAGE--      334
E21   ZZ=PLANNING// LIBRARY---     1224
E22   ZZ=PLANNING// LONG RANGE      228
E23   ZZ=PLANNING// PROGRAM---        1
E24   ZZ=PLANNING// REGIONAL--      657
E25   ZZ=PLANNING// SCHOOL----      733
E26   ZZ=PLANNING// SOCIAL----      254
E27   ZZ=PLANNING// STATE WIDE        1
E28   ZZ=PLANNING// STATEWIDE-     1910
E29   ZZ=PLANNING// URBAN-----      465
E30   ZZ=PLANS----------------    10355
E31   ZZ=PLANS// BUILDING-----      171
E32   ZZ=PLANS// DESEGREGATION      365
E33   ZZ=PLANS// LESSON-------     1828
E34   ZZ=PLANS// MASTER-------      625
E35   ZZ=PLANS// ROTATION-----       25
E36   ZZ=PLANS// STUDIO FLOOR-       28
E37   ZZ=PLANT----------------     2118
                                    -more-
```

To retrieve material on "library planning", the EXPAND number can be SELECTed, e.g.,

```
? SELECT E21
          50  1224 ZZ=PLANNING// LIBRARY
? TYPE 50/8
50/8/1
EJ234684
  Politics of Cooperation in a Networking Era.
  Descriptors:  *Library  Administration/  Library  Automation/
*Library Cooperation/ *Library Networks/ Library Planning
```

The double slash (//) in the EXPAND entries is used to indicate the break point between the end and beginning of rotated multiword descriptors. Only the first 39 characters of longer rotated phrases are displayed in the EXPAND. The online rotated list includes not only complete descriptors, but also each individual descriptor word. The postings listed for individual descriptor words include all occurrences of the word in the Basic Index. For example, when searching on the topic "planning":

```
? SELECT E6
          51 35141 ZZ=PLANNING
```

retrieves all records with the word "planning" in any of the Basic Index fields. For more precise retrieval,

```
 ? SELECT PLANNING/DE
          52 20022 PLANNING  (THE PROCESS OF DETERMINING OBJECTIVES
```

This retrieves only records with the word "planning" as a descriptor word.

LIMITING

The LIMIT command is used to reduce a set according to some criterion applicable to the database. Generally this command is entered after SELECTing the appropriate set. Sets SELECTed in the ERIC database may be LIMITed by subfile, by accession number within each subfile, by document availability, and by major or minor descriptor or identifier.

ED or EJ Subfile. A SELECTed set can be restricted to the nonjournal literature subfile (RIE) or the journal literature subfile (CIJE) using the /ED or /EJ suffixes respectively as illustrated below.

```
 ? SELECT SCIENCE(W)EDUCATION
          53 19218 SCIENCE(W)EDUCATION
 ? LIMIT 53/ED; LIMIT 53/EJ
          54  5515  53/ED
          55 13703  53/EJ
```

Accession Number. The DIALOG accession number which appears in each printed record is an eight-character number which includes the ED or EJ prefix followed by six digits and corresponds to the accession number which appears on each record in the printed RIE or CIJE. To LIMIT by accession number range, the prefix is dropped and the appropriate suffix is used with the accession number range.

The annual accession number ranges that may be used with the LIMIT command for each subfile are listed below. These ranges are also available online by entering ?LIMITI.

Year	ED Numbers	EJ Numbers
Pre-66	002747-003960/ED	
1966	010000-010093/ED	
1967	010094-012348/ED	
1968	012349-021151/ED	
1969	021152-031604/ED	000001-011707/EJ
1970	031605-042060/ED	011708-027599/EJ
1971	042061-054390/ED	027600-045271/EJ
1972	054391-066620/ED	045272-062751/EJ
1973	066621-080787/ED	062752-082164/EJ
1974	080788-095253/ED	082165-101872/EJ
1975	095254-110594/ED	101873-121926/EJ
1976	110595-127413/ED	121927-142252/EJ
1977	127414-142684/ED	142253-163351/EJ
1978	142685-157987/ED	163352-186217/EJ
1979	157988-174743/ED	186218-207484/EJ
1980	174744-190736/ED	207485-229235/EJ
1981	190737-	229236-

To restrict a set to a given time period, the appropriate DIALOG accession number range for each subfile is used, and the resulting sets are COMBINEd using the Boolean OR. For example, to LIMIT set 53 to those documents announced in ERIC from 1978 to the present:

```
? LIMIT 53/142685-999999/ED
          56  1831  53/142685-999999/ED←————ED documents 1978+
? LIMIT 53/163352-999999/EJ
          57  5726  53/163352-999999/EJ←————EJ articles 1978+
? COMBINE 56 OR 57
          58  7557  56 OR 57←———————————————Both ED and EJ documents
```

In LIMITing by accession number range, it is necessary to have all the digits filled with numbers. To retrieve citations including the very newest entries, it is possible to fill the upper range with nines as shown in the example above.

A single beginning and ending range of accession numbers can be used without the ED or EJ for both types of documents, but the years covered will be imprecise; thus its use is not recommended for most searches.

Document Availability. A SELECTed set can be restricted to those documents for which full copies are available or not available from the ERIC Document Reproduction Service (EDRS) using the suffixes /AVAIL and /UNAVAIL respectively.

```
? LIMIT 53/AVAIL
          59  4301  53/AVAIL
? LIMIT 53/UNAVAIL
          60 14917  53/UNAVAIL
```

Since copies of documents announced in the CIJE subfile are not available from EDRS, the available documents are always from the RIE (or ED) subfile.

Major or Minor Descriptor or Identifier. The asterisked descriptors and identifiers (which are also the subject index entries in the printed RIE and CIJE) are considered to be major terms. A search may be LIMITed to only major terms using /MAJ. The /MIN suffix LIMITs the set to all other occurrences of the term.

The /MAJ and /MIN suffixes are properly applied to sets formed from terms SELECTed in the Descriptor and/or Identifier fields. LIMITing with the /MAJ suffix is a convenient way to restrict the output of a search; however, this feature should be used cautiously. Whenever a set which does **not** include descriptor or identifier words has been ANDed into the set being LIMITed, the result will be a zero posting, e.g., a set that includes PY=1980 ANDed to another term will result in zero postings if LIMITed to /MAJ because the PY= field has no major designation. The proper approach is to first LIMIT the set in which descriptor or identifier words have been SELECTed, then combine the LIMITed set AND the other set, e.g.,

```
? SELECT SCIENCE(W)EDUCATION
          61 19218 SCIENCE(W)EDUCATION
? LIMIT 61/MAJ
          62  5154  61/MAJ
? SELECT PY=1980 AND S62
               19395 PY=1980
          63   296  PY=1980 AND S62
```

In this case, SCIENCE EDUCATION is an ERIC descriptor, so the LIMIT works properly.

Multiple LIMITs. Multiple LIMITs can be used if they are entered in the acceptable order, namely, the accession number range precedes the subfile, which precedes the major/minor term, which precedes the availability/nonavailability specification. For example, to apply all of the LIMIT restrictions to the set on Science Education, the following entry is used:

```
? LIMIT 61/080788-999999/ED/MAJ/AVAIL
          64  1165  61/080788-999999/ED/MAJ/AVAIL
```

However, the above entry is redundant. Since the availability LIMIT restricts the set to only ED documents, it is not necessary to include the ED suffix in the command, e.g.,

```
? LIMIT 61/080788-999999/MAJ/AVAIL
          65  1165  61/080788-999999/MAJ/AVAIL
```

The general order listed above must be followed even when only some of the LIMIT specifications are used, e.g.,

```
 ? LIMIT 61/080788-999999/ED/MAJ
           66  1393  61/080788-999999/ED/MAJ
```

LIMITALL. The LIMITALL command can be used in two ways: to LIMIT to an accession number range or to restrict the search to ED or EJ documents. The LIMITALL command can be used with the /ED or /EJ suffix to restrict all subsequent sets to the subfile specified by the suffix, until the command is cancelled with the LIMITALL/ALL command or a new LIMITALL command, e.g.,

```
? LIMITALL/ED
          LIMIT ALL ALL/ED
? SELECT SCIENCE(W)EDUCATION
          67  5515 SCIENCE(W)EDUCATION
```

The accession number range can be entered with the LIMITALL command to restrict all subsequent sets to the time period specified by the accession numbers within the appropriate subfile, until the command is cancelled with the LIMITALL/ALL command or a new LIMITALL command, e.g.,

```
? LIMITALL/080788-999999/ED
          LIMIT ALL ALL/080788-999999/ED
? SELECT SCIENCE(W)EDUCATION
          68  4316 SCIENCE(W)EDUCATION
? LIMITALL/ALL
          LIMIT ALL ALL/ALL
```

SORTING

Search results obtained in ERIC may be sorted either online using .SORT or offline using PRINT and incorporating the sorting parameters into the command. Search results may be sorted by the following fields using the two-letter code to specify the field:

AU	Author
CS	Corporate Source Name
JN	Journal Name
PY	Publication Year
TI	Title

The following general format is used to sort items online:

```
.SORT set/range/field,sequence
```

where the sequence may be A (ascending order - A to Z, or numerically lowest to highest) or D (descending order - Z to A, or numerically highest to lowest). If the sequence is not specified, the system assumes ascending order. For example, to .SORT results alphabetically by author, the following statement can be entered:

```
.SORT 8/1-72/AU
```

Use of the .SORT command online results in a new set which can be TYPEd online or PRINTed offline.

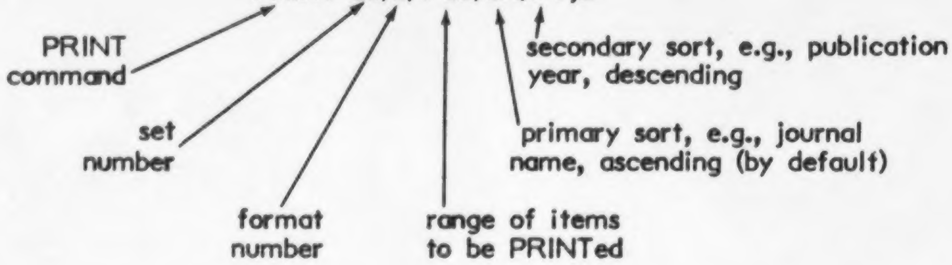
If only sorted offline output is desired, it is more efficient to use the PRINT command incorporating the sorting parameters. The format must be included with the offline PRINT request, e.g.,

```
PRINT 14/5/1-68/AU
```

to PRINT the 68 records in set 14 offline in format 5 sorted by author.

Secondary sort fields and sequence can also be specified for both online .SORTing and offline PRINTing. A sample sorted PRINT command including more than one field follows:

```
PRINT 25/5/1-50/JN/PY,D
```


PRINT command
set number
format number
range of items to be PRINTed
primary sort, e.g., journal name, ascending (by default)
secondary sort, e.g., publication year, descending

SEARCH AIDS

The following search aids are available for use with the ERIC database:

A Bibliography of Publications about the Educational Resources Information Center. 1978. Free.

Directory of ERIC Microfiche Collections. Biannual. Free. A listing of the libraries and information centers that have a standing order to the ERIC microfiche collection. The directory gives collection scope/size, equipment and services and accessibility data, as well as the name and phone number of a contact person at each collection. Many of these facilities are open to the general public, and will duplicate microfiche and/or hardcopy.

Directory of ERIC Search Services. 1981. Biannual. Free. A listing of the sites which provide search services on a regular basis--irrespective of whether the service is available only to a circumscribed community or to all users without restrictions.

ERIC Contract/Grant Number Index. Annual. $10.00 (U.S.) and $12.00 (Elsewhere).

ERIC Identifier Authority List. Semiannual. $10.00. List of 26,000 identifier terms.

ERIC Processing Manual. EDRS, P.O. Box 190, Arlington, VA 22210. Telephone: 703/841-1212. $40.00. Subdivided by section with two appendices, sections and appendices each available individually. $3.75 per section. Sections include: 1) Introduction (an overview of the ERIC system). 2) Acquisitions. 3) Selection. 4) Handling and Shipping. 5) Cataloging (includes description of each search field). 6) Abstracting, Annotating. 7) Indexing. 8) Vocabulary Development and Maintenance - Part 1, Descriptors; Part 2, Identifiers ($3.75 each part). 10) Data Base Changes (Post Publication). Appendix A, ERIC Clearinghouse Scope of Interest Guide. Appendix B, Glossary of Terms. (Section 9, Data Entry, not available. Section 5 and Appendix B available June 1981. Manual as a whole with preface and indexing available in late 1981. All sections other than those noted are presently available as separates.)

ERIC Ready Reference #1. Free. A ready reference sheet to be posted near computer terminals used for searching ERIC, this chart provides a year-by-year list of ERIC accession numbers for Resources in Education (RIE) and the Current Index to Journals in Education (CIJE).

ERIC Report/Project Number Index, Cumulative. $30.00 (U.S.) and $36.00 (Elsewhere). Annual subscription price: $50.00 (U.S.) and $57.00 (Elsewhere).

ERIC Title Index. Annual cumulations with quarterly supplements, 1977- (1966-1976 out of print). Annual subscription price for the cumulations: $45.00 (U.S.) and $60.00 (Elsewhere).

How to Prepare for a Computer Search of ERIC; a Nontechnical Approach, by Judith Yarborough. 1975. ERIC Clearinghouse on Information Resources, Stanford University, Stanford, CA 94305. Available from ERIC Document

Reproduction Service: $3.32 (hardcopy) and $.83 (microfiche). (ED 110096). (Note that search term examples are based on an earlier edition of the Thesaurus of ERIC Descriptors than that now in use).

How to Start an ERIC Collection. Free. Available from ERIC Processing and Reference Facility or any of the ERIC Clearinghouses.

How to Use ERIC. Educational Resources Information Center, National Institute of Education, Washington, DC 20208. Free. Available from ERIC Processing and Reference Facility or any of the ERIC Clearinghouses.

Institutional Source Directory. Annual. Published quarterly, $12.00 (U.S.), $18.00 (Elsewhere). Annual subscription: $45.00 (U.S.), $50.00 (Elsewhere). An alphabetical listing of the names of all institutions by which documents in the ERIC system have been indexed in the Corporate Source and Sponsoring Agency Name fields of the citation, together with the corresponding alphanumeric code which appears in the Corporate Source field of each record.

Interchange Newsletter. Free. The newsletter used by the ERIC Processing and Reference Facility to communicate with ERIC users. Quarterly.

A Pocket Guide to ERIC. Free. List of Clearinghouse products, use of ERIC tools, and a summary of ERIC services. Available from ERIC Processing and Reference Facility or any of the ERIC Clearinghouses.

RIE/CIJE Descriptor and Identifier Usage Report. 1969-1980. $16.85 (microfiche). Lists each ERIC descriptor and identifier and the number of times used within the date range. Parts available separately: *RIE Descriptor Usage Report.* 1969-1980. $5.25 (microfiche). *RIE Identifier Usage Report.* 1969-1980. $3.35 (microfiche). *CIJE Descriptor Usage Report.* 1969-1980. $4.75 (microfiche). *CIJE Identifier Usage Report.* 1969-1980. $3.50 (microfiche). EDRS, P.O. Box 190, Arlington, VA 22210. Telephone: 703/841-1212.

Searching the ECER and ERIC Databases on Lockheed/DIALOG and Eliminating Duplication. CEC Information Services, 1920 Association Dr., Reston, VA 22091. Free.

Thesaurus of ERIC Descriptors. Completely revised, 1980. The Oryx Press, 2214 North Central Avenue, Suite 103, Phoenix, AZ 85004. Telephone: 602/254-6156. $13.20 U.S., $14.40 overseas (paperback).

Unless otherwise noted above, all these search aids are published by and available from:

ERIC Processing and Reference Facility
4833 Rugby Ave., Suite 303
Bethesda, MD 20014
Telephone: 301/656-9723.

INDEX

Answer sets to ONTAP search topics 39-42, 48

BEGIN command 32
Boolean operators 10-12, 18-20
Briefsearch 3, 7, 8, 13, 14-15, 24, 32, 36
  examples of, in self-improvement exercises 51, 61, 64, 71, 76, 78, 81, 87-88, 90, 94, 97, 99, 102, 105, 109
Building block approach to search strategy 12-14
  examples of, in Search Save formulations 52-53, 113-114, 116-140
  examples of, in self-improvement exercises 44-45, 53-54, 64-65, 71-72, 78, 89-90, 94-95, 100-101, 105-107, 109-111

Citation pearl growing approach to search strategy 14-16, 23
  examples of, in self-improvement exercises 103-104
Compiling the search terms 4, 6, 22-23
Computer working memory 13, 29-35
Concept groups. See Facet analysis.
Conceptualizing the search as input to the retrieval system 5, 24, 29-35
Controlled term searching 6, 22, 28-29
  examples of, in Search Save formulations 129-131
  examples of, in self-improvement exercises 44, 58, 65-67, 79, 82, 87-88, 90-92, 95, 100, 105-107, 110, 111
Cost as a search objective 8, 36, 37-38, 60-62
  in self-improvement exercises 60, 75

Data base selection. See Identifying relevant data bases.
Defining the information-need and search objective 3, 6-8
Descriptor 4
  field of ERIC record 22, 27
  function of 8
"Difficult" ERIC ONTAP search topics, list of 67-68

ERIC data base, description of 141-143, 146-174 (appendix)
ERIC ONTAP data base, description of 39-42, 45-49, 144-145 (appendix)
/EVAL command 42, 48
Evaluating final results 5, 37-38
EXPAND command 23, 31, 54-55

Facet analysis 4, 5, 6, 10-12, 12, 44, 85, 86-87, 94, 97, 99, 102, 105, 109-110
Formulating basic search logic 4, 10-21, 24
Free text searching 4, 6, 22-23, 27-28
  examples of, in Search Save formulations 51-53, 113-115, 116-131, 135-140
  examples of, in self-improvement exercises 44, 53-55, 58, 60-61, 71, 75, 78-79, 81-82, 86, 90-92, 94-95, 97-98, 102-103, 105, 109

High precision as a search objective 3, 7-8, 37-38
  in Search Save formulations 132-134
  in self-improvement exercises 50, 63, 92-94

High recall as a search objective 3, 7, 27, 37-38
  in Search Save formulations 51-53, 113-114, 116-131, 135-140
  in self-improvement exercises 43, 50, 60, 63, 71-72, 75, 78, 81-82, 85-88 89-92, 99-100, 105-107, 109-111

Identifier 4
  field of ERIC record 22, 27
  function of 8
Identifying relevant data bases 3, 9
Interviewing the information seeker 6

LIMIT command 32-34, 64, 89-90
LIMITALL comand 17, 33
Lowest postings facet first approach to search strategy 20-21
  examples of, in self-improvement exercises 71-72

"Medium" ERIC ONTAP search topics, list of 55-56
Most specific facet first approach to search strategy 19-20
  examples of, in self-improvement exercises 53-55, 58, 75-76, 89-92, 97, 102

Online alphabetic word list 4, 23
Online ERIC Thesaurus 4, 23
Online searching, steps and functions of 3-5, 6-38, 42
ONTAP data base, description of 39-42, 45-49, 144-145 (appendix)
Ordering output 4, 6, 24-25
Output
  format of 6, 25
  limiting of 4, 5, 6, 17, 25, 69
  printing of 4, 103
  size of 11, 17, 19, 20, 24

Precision, definition of 7, 37-38. See also High precision.

Recall, definition of 7, 37. See also High recall.
Relevance of citations of ONTAP answer sets 37, 40-41
Roget's Thesaurus 22, 43

Search objectives 3, 6-8, 36, 40
Search saves
  common search facets/Search Save formulations 116-140 (appendix)
  example of 52
  exchanging of, across DIALOG passwords 115
  to bypass computer memory limitations 34-35
Search strategy, approaches to 4, 6, 10-21, 40
Search strategy, formulation of. See Formulating basic search logic.
"Simple" ERIC ONTAP search topics, list of 47
Successive fractions approach to search strategy 17-19
  examples of, in self-improvement exercises 65-67, 86

Thesaurus of ERIC Descriptors 23, 39, 43, 85
Thesaurus of Psychological Index Terms 23, 43
Truncation 29-30

Word proximity 8, 26, 28-29, 32